

T-WREX

PARTS, DRAWINGS, SERVICE & OPERATION MANUAL

T-WREX SR. MODEL 60000 TW

S/N: 100 - 105

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5/13

AIR AND HYDRAULIC REQUIREMENTS

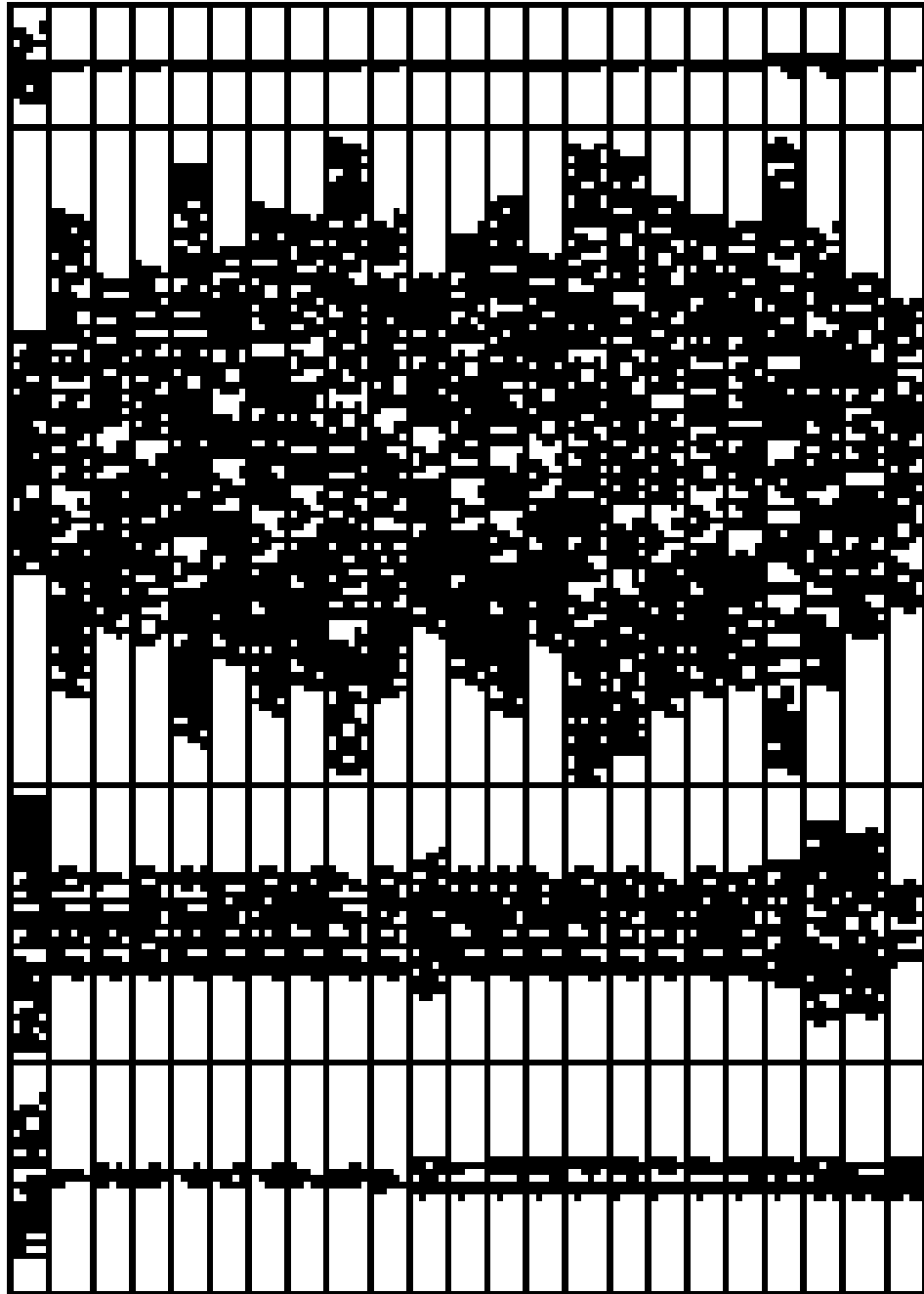
**ALL CONFIGURATIONS REQUIRE A HYDRUALIC POWER UNIT CAPABLE
OF DELIVERING 20-35 GPM AT 3000 PSI CLOSED-CENTER**

Compressed Air: 100psi @ 10-20cfm for air piloted models

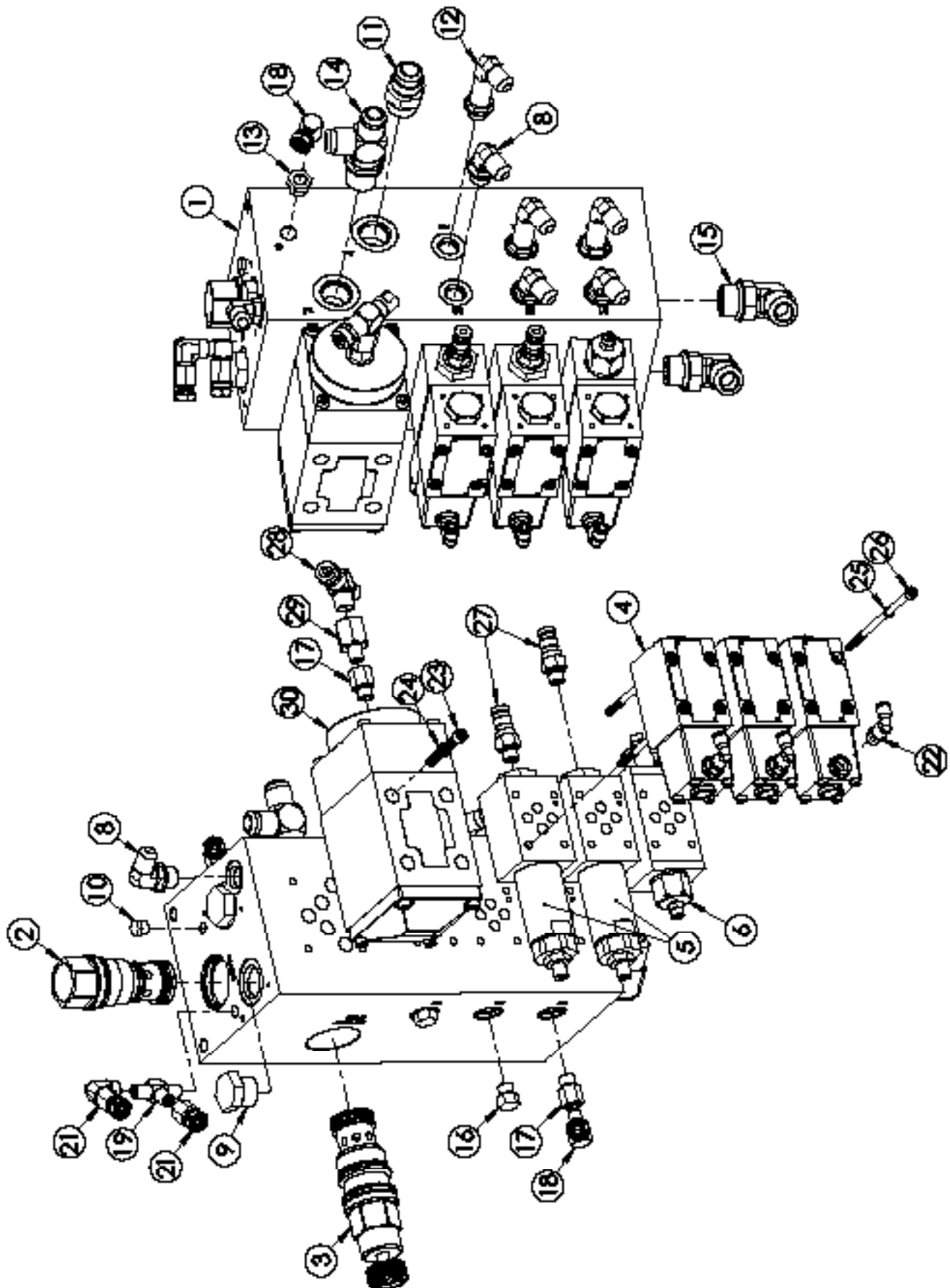
<div style="display: flex; justify-content: space-between;"> 51700 T-WREX SR. ASSEMBLY </div>



51700
T-WREX SR. ASSEMBLY

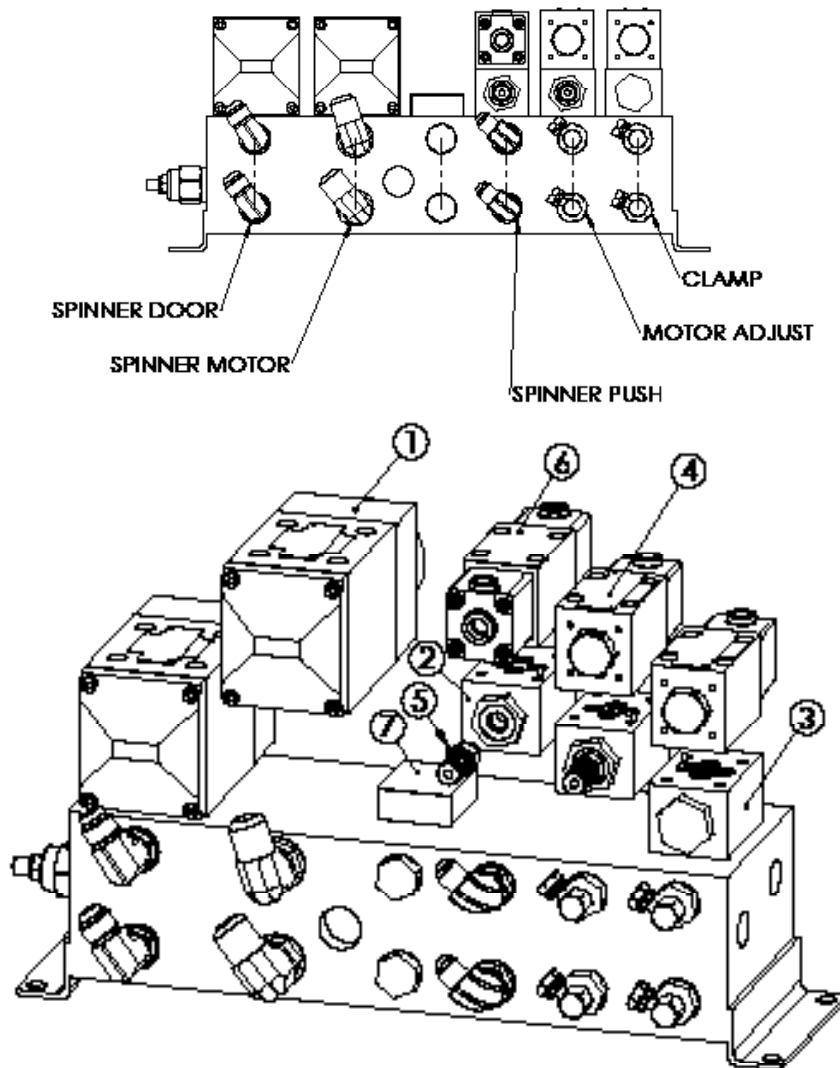


51627
MAIN MANIFOLD ASSEMBLY



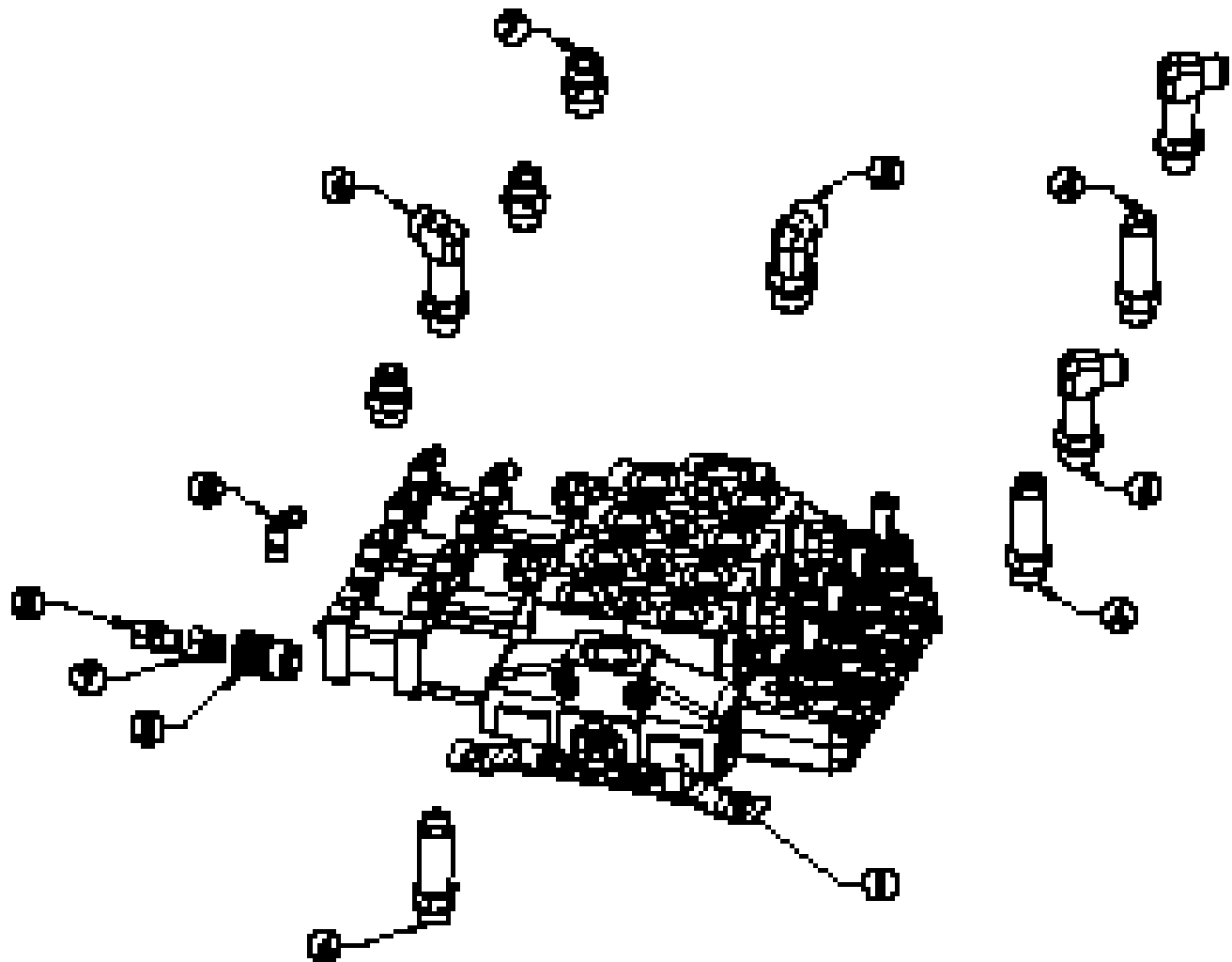
MAIN MANIFOLD ASSEMBLY

30	T172	TORQUE VALVE, D05	1
29	5405-2-4	-2MNPT X -4FNPT REDUCER	1
28	T161	QUICK EXHAUST	1
27	H71	1/4" QUICK DISCONNECT MALE	2
26	809475-375	#10-24 X 3.75 LG. SHCS	12
25	809476	#10 LOCK WASHER	12
24	810588	1/4" LOCK WASHER, HI COLLAR	4
23	808193	1/4"-20 x 1.75 LG. SOC. HD. CAP SCREW	4
22	A46	-2MNPT X 5/32" PTC ELBOW	3
21	2046-2-2S	-2FNPT X -2FNPT STR. SWIVEL	2
20	2089-2-2S	-2MNPT X -2FNPT 90 DEG ELBOW	1
19	2257-2-2S	-2MNPT T FITTING	1
18	2047-2-2S	-2MNPT X -2FNPT 90 DEG. SWIVEL	2
17	2216-2-4S	-4FNPT X -4MORB STR. ADAPTOR	2
16	900598-4S	-4MORB PLUG	2
15	2062-10-10S	-10MORB X -10MLIC FITTING 90 DEG.	2
14	203005-10-8S	-10MORB X 2X -8MLIC T FITTING	1
13	2081-4-2S	-4MNPT X -2FNPT HEX BUSHING HP	1
12	206209-6-6S	-6MORB X -6MLIC FITTING 90 DEG. EXT.	3
11	202702-10-10S	-10MORB X -10MLIC STR. ADAPTOR	1
10	2082-2S	-2MNPT PLUG	1
9	900598-10S	-10MORB PLUG	2
8	2062-6-6S	-6MORB X -6MLIC FITTING 90 DEG.	4
6	H6747	FLOW CONTROL VALVE, D03	1
5	H6P	PRESSURE CONTROL VALVE, D03	2
4	369	DIRECTIONAL VALVE, D03	3
3	J55A	PRESSURE REDUCING VALVE, CARTRIDGE	1
2	J55B	CHECK VALVE, CARTRIDGE	1
1	5250-0527	MAIN MANIFOLD	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.



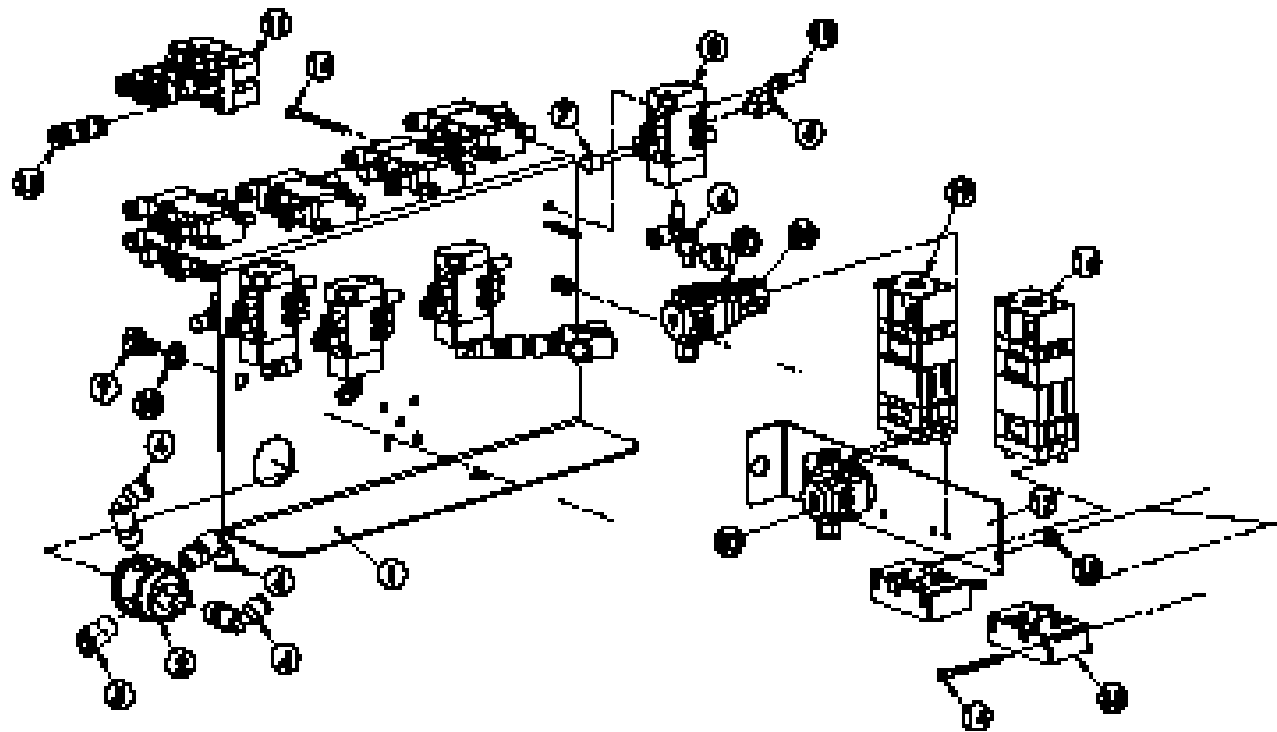
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	856	DIRECTIONAL VALVE	2
2	H6P	PRESSURE CONTROL VALVE, D03	2
3	H7	PILOT CHECK SANDWICH	1
4	369	DIRECTIONAL VALVE, D03	2
5	H71	1/4" QUICK DISCONNECT MALE	2
6	368	DIRECTIONAL VALVE, D03	1
7	AD03CCP	PLATE, BLOCKOFF	1
8	2062-8-8S	-8MORB X -8MJIC FITTING 90 DEG.	2
9	2062-10-10S	-10MORB X -10MJIC FITTING 90 DEG.	2
10	900598-8S	-8MORB PLUG	2
11	2047-2-2S	-2MNPT X -2FNPT 90 DEG. SWIVEL	4
12	900598-8S	-8MORB -2FNPT	4
13	2062-8-6S	-8MORB X -6MJIC FITTING 90	2
14	A612	MANIFOLD BLOCK	1
15	T157	CARTRIDGE VALVE, SEQUENCE	1
16	H48	SPOOL DIRECTIONAL VALVE, PILOT OPERATED	1

51625
SUPPLY VALVE ASSEMBLY



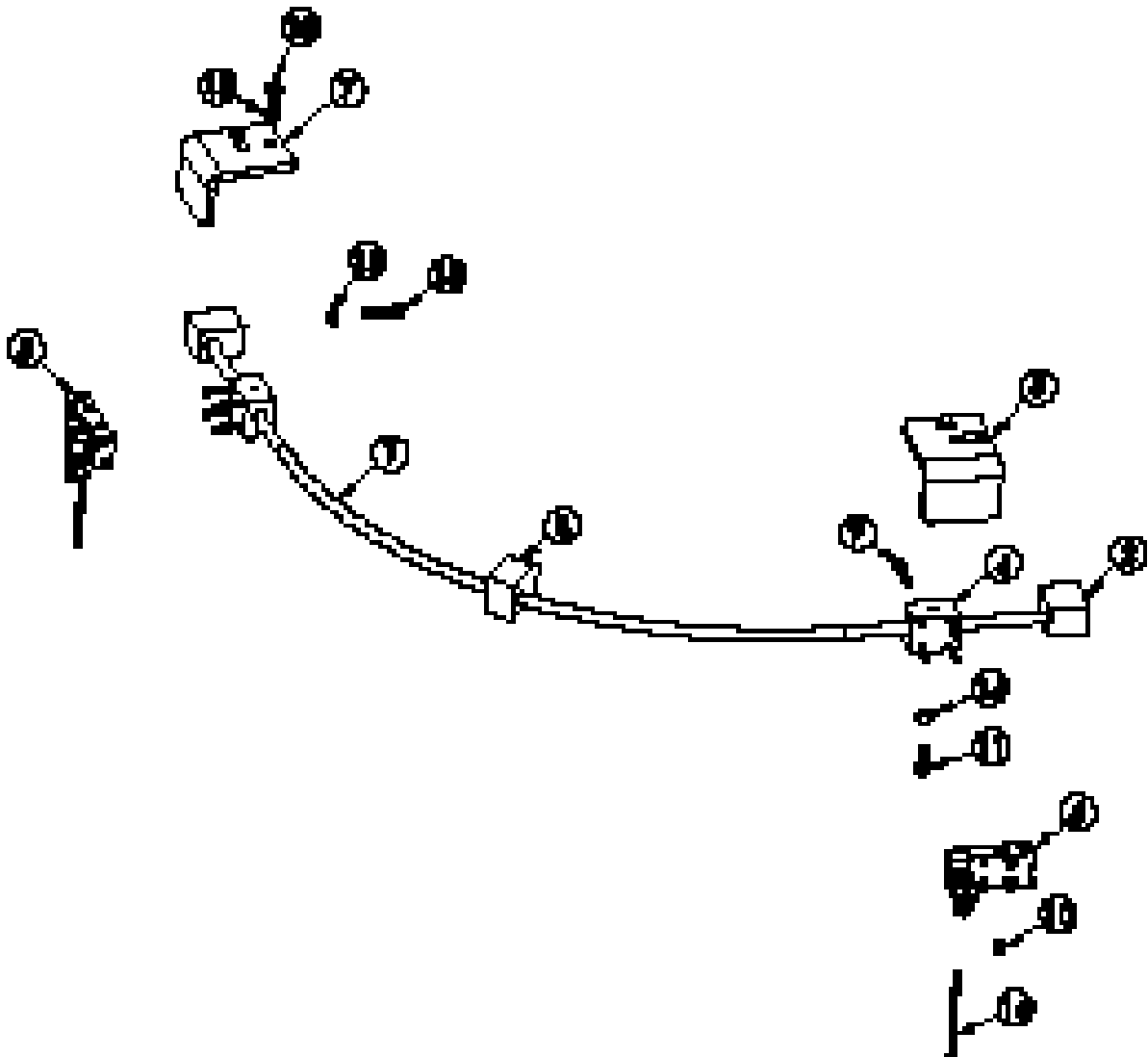
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	71402	SUPPLY VALVE	1
2	71402	PLUG	1
3	71402	HANDLE	1
4	71402	PIN	1
5	71402	SPRING	1
6	71402	WASHER	1
7	71402	SEAL	1
8	71402	NUT	1
9	71402	BOLT	1
10	71402	SCREW	1
11	71402	PIN	1

51482
LOGIC PANEL ASSEMBLY



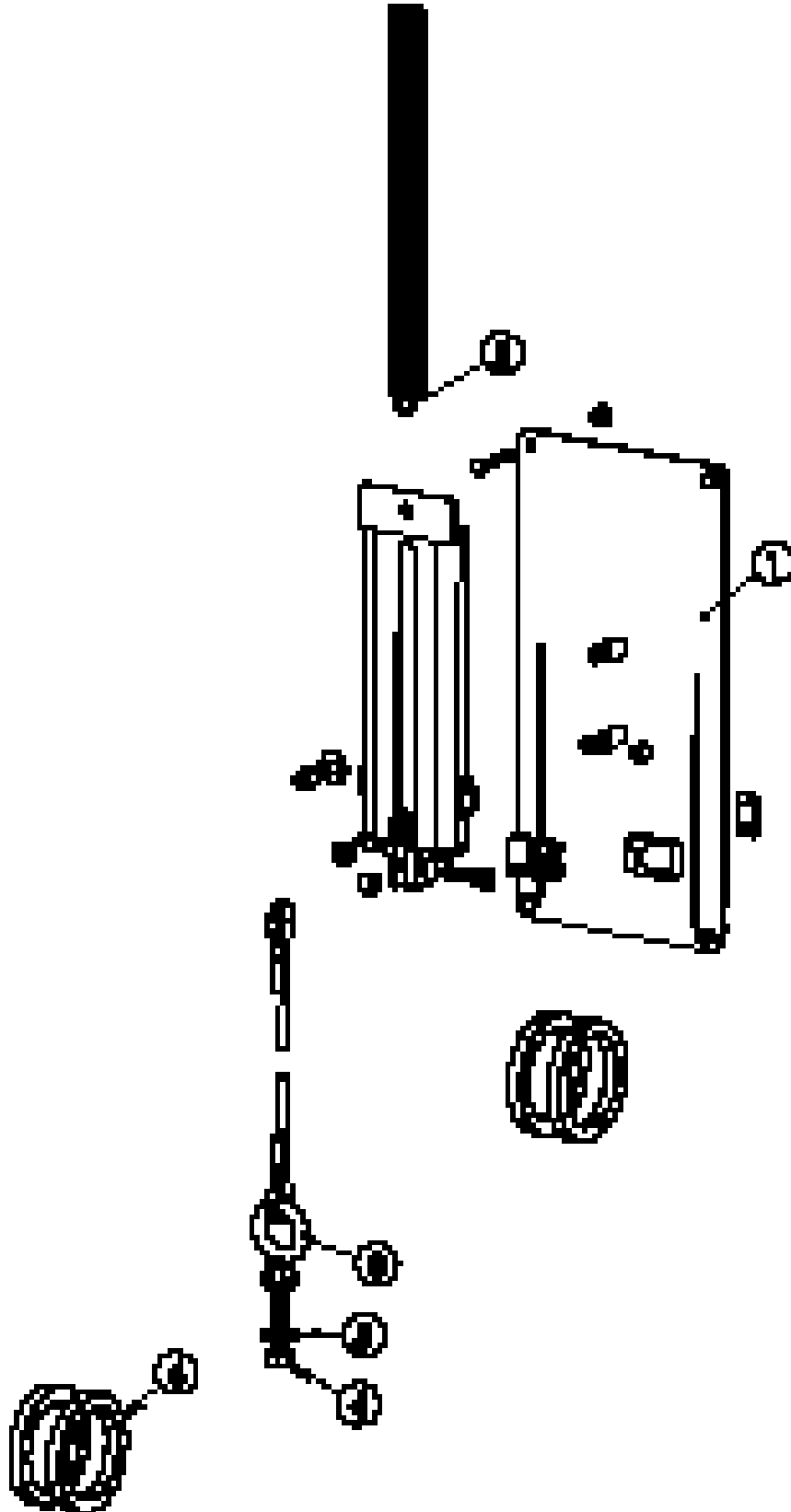
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4		1	IC	
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100		1	IC	

ROTATION LIMIT ASSEMBLY



QTY. REQ.	PART NUMBER	DESCRIPTION	QTY.
1	41400	ROT. LIMIT. BODY	1
2	41401	ROT. LIMIT. END BLOCK	2
3	41402	ROT. LIMIT. CENTER BLOCK	1
4	41403	ROT. LIMIT. SWITCH BLOCK	2
5	71133	ROTATION LIMIT SWITCH LEFT	1
6	71134	ROTATION LIMIT SWITCH RIGHT	1
7	41404	LEFT ROT. LIMIT SWITCH COVER	1
8	41405	RIGHT ROT. LIMIT SWITCH COVER	1
9	41406	2-1/2" X 1-1/2" L. PAIN PAIN SCREW	4
10	41407	2-1/2" X 1-1/2" L. PAIN PAIN	4
11	41408	1-1/2" X 1-1/2" L. PAIN PAIN	2
12	41409	1-1/2" L. PAIN PAIN	4
13	41410	1-1/2" X 1-1/2" L. PAIN PAIN	2
14	41411	1-1/2" X 1-1/2" L. PAIN PAIN	2
15	41412	1-1/2" X 1-1/2" L. PAIN PAIN	4
16	41413	LEFT. ROT. LIMIT SWITCH	2

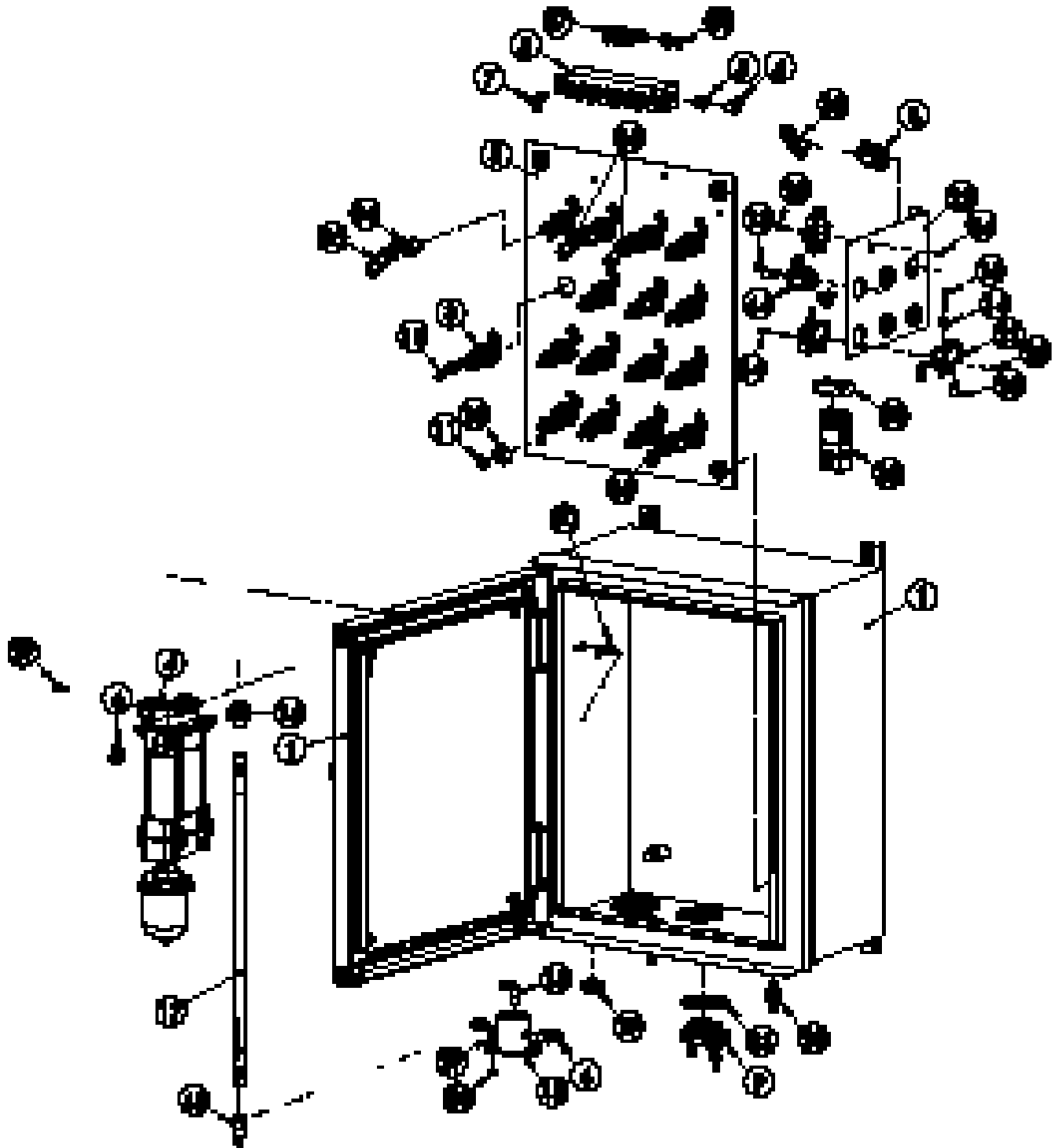
51800
CABLE SENSOR



51800
CABLE SENSOR

TIME REC.	PARTY NAME	ADDRESS	ZIP
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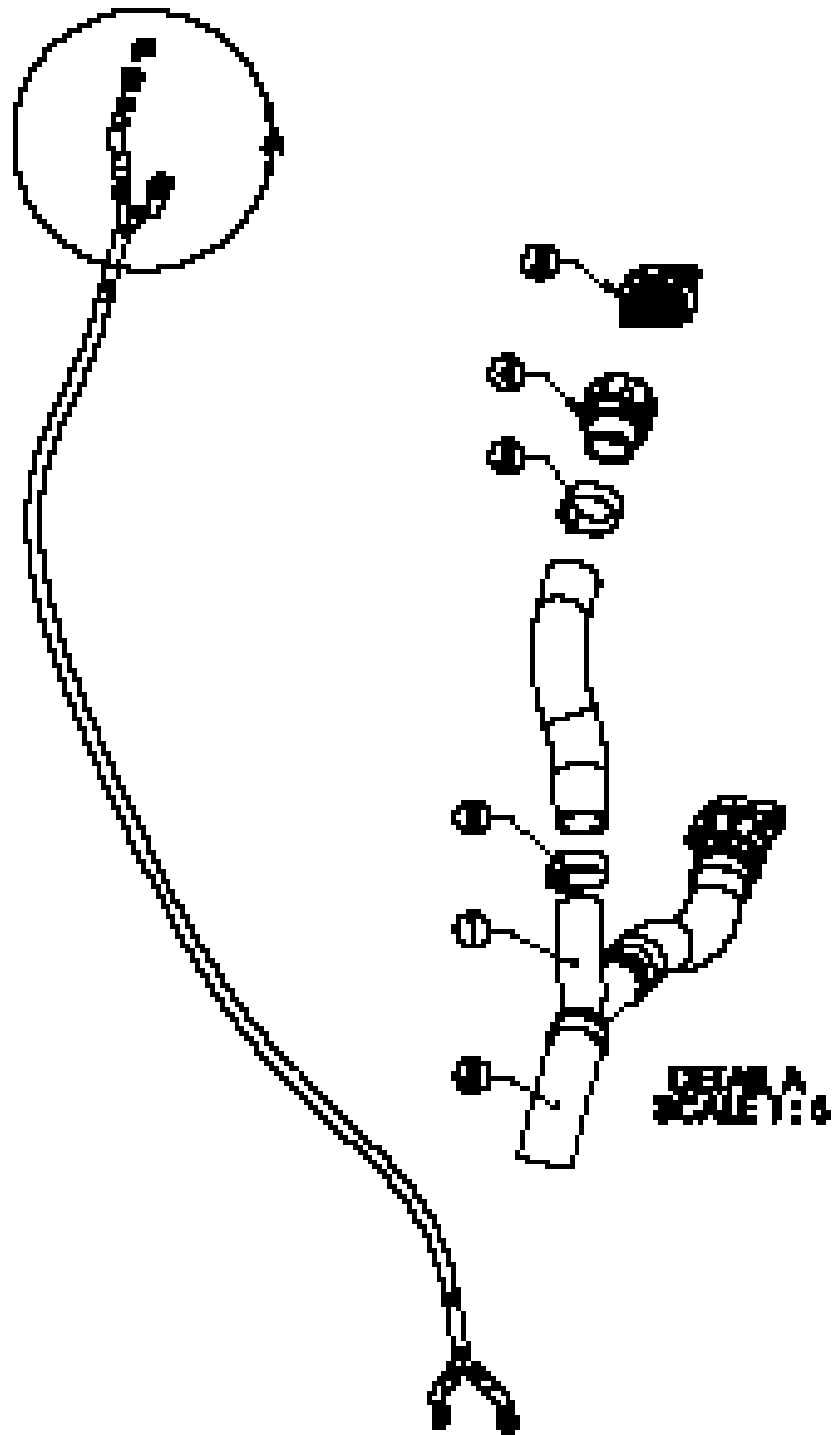
51480
RELAY BOX ASSEMBLY



<div style="display: flex; justify-content: space-between;"> 51480 RELAY BOX ASSEMBLY </div>
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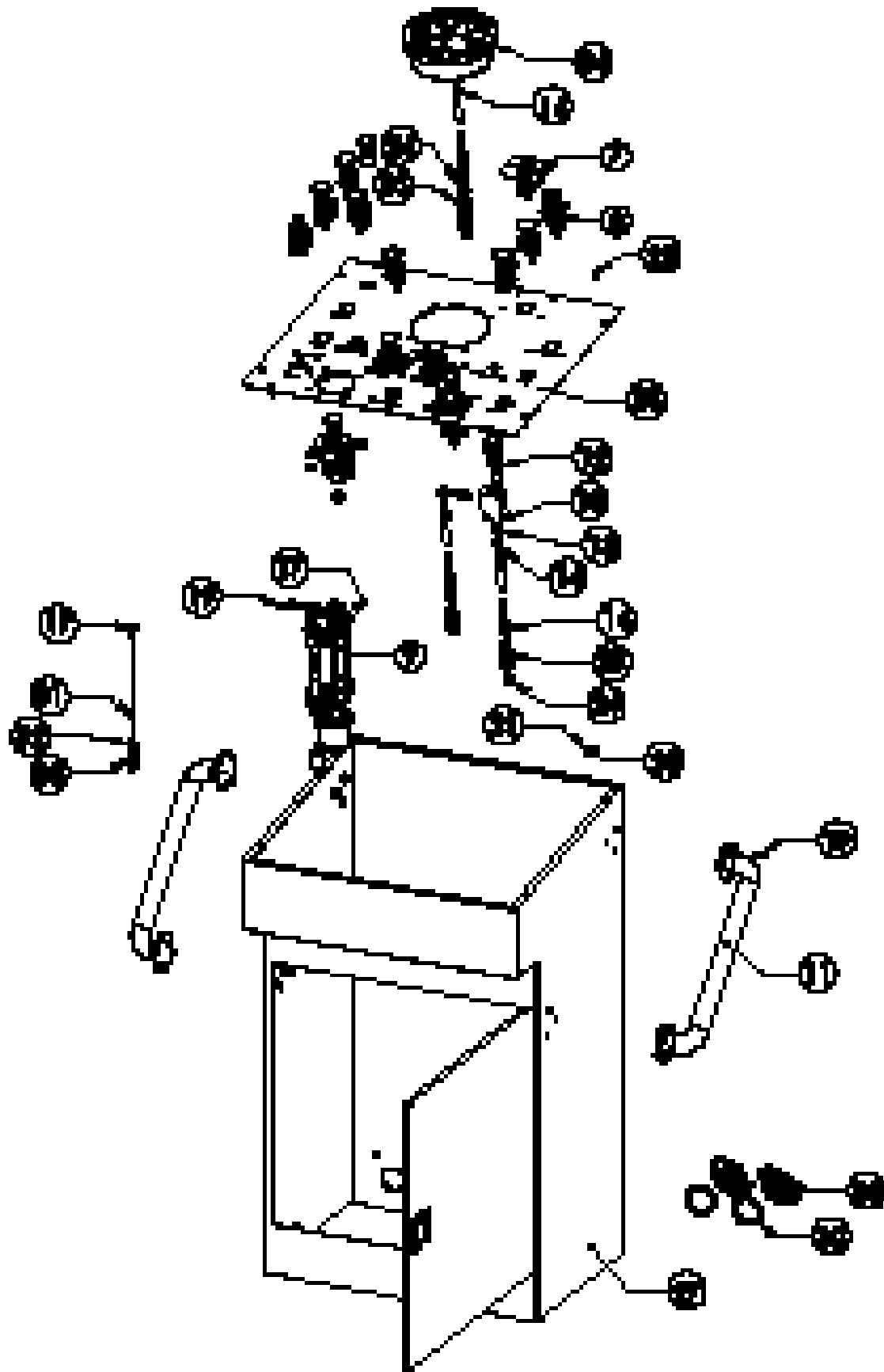
T168
50 FOOT CONNECTOR



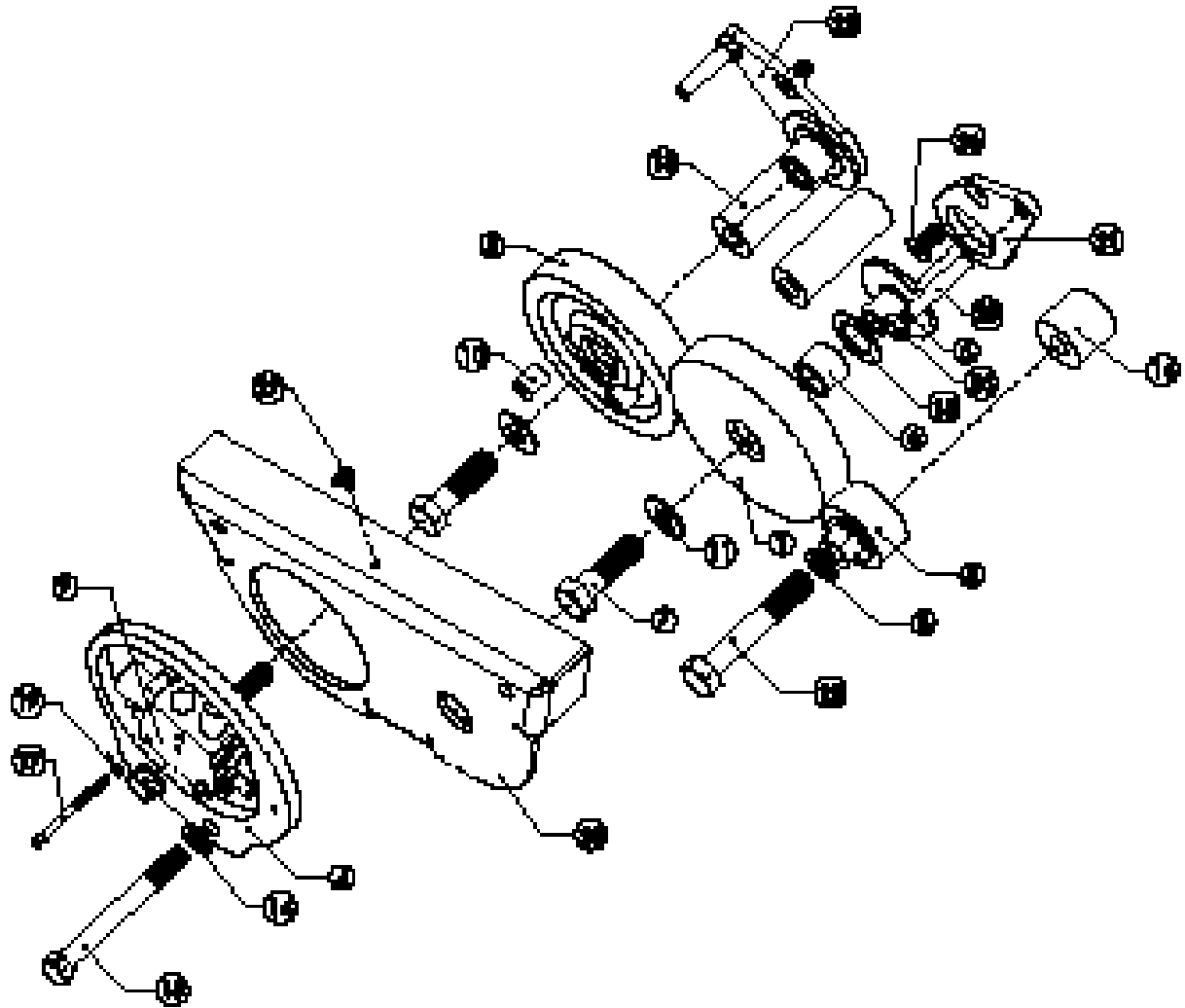
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	8994	CONDUIT RING	2
2	834	HOSE CLAMP	10
3	822	CONTROL CONDUIT	2
4	T168	1.50 STRAIGHT CONDUIT CONNECTOR	4
5	T167	LOWER CONNECTOR MULTIPLEX 14 PORT	4

NOTES:

51507
CONSOLE ASSEMBLY

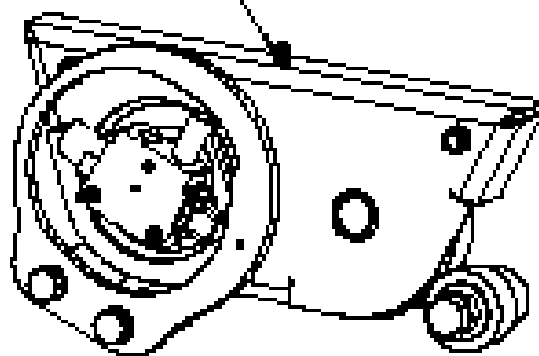


51141
SYNCHRONIZATION ASSEMBLY



COAT ALL GEARS AND HUBS IN MARINE GRADE MOLT GREASE (945064)

MARINE GRADE MOLT GREASE ONLY



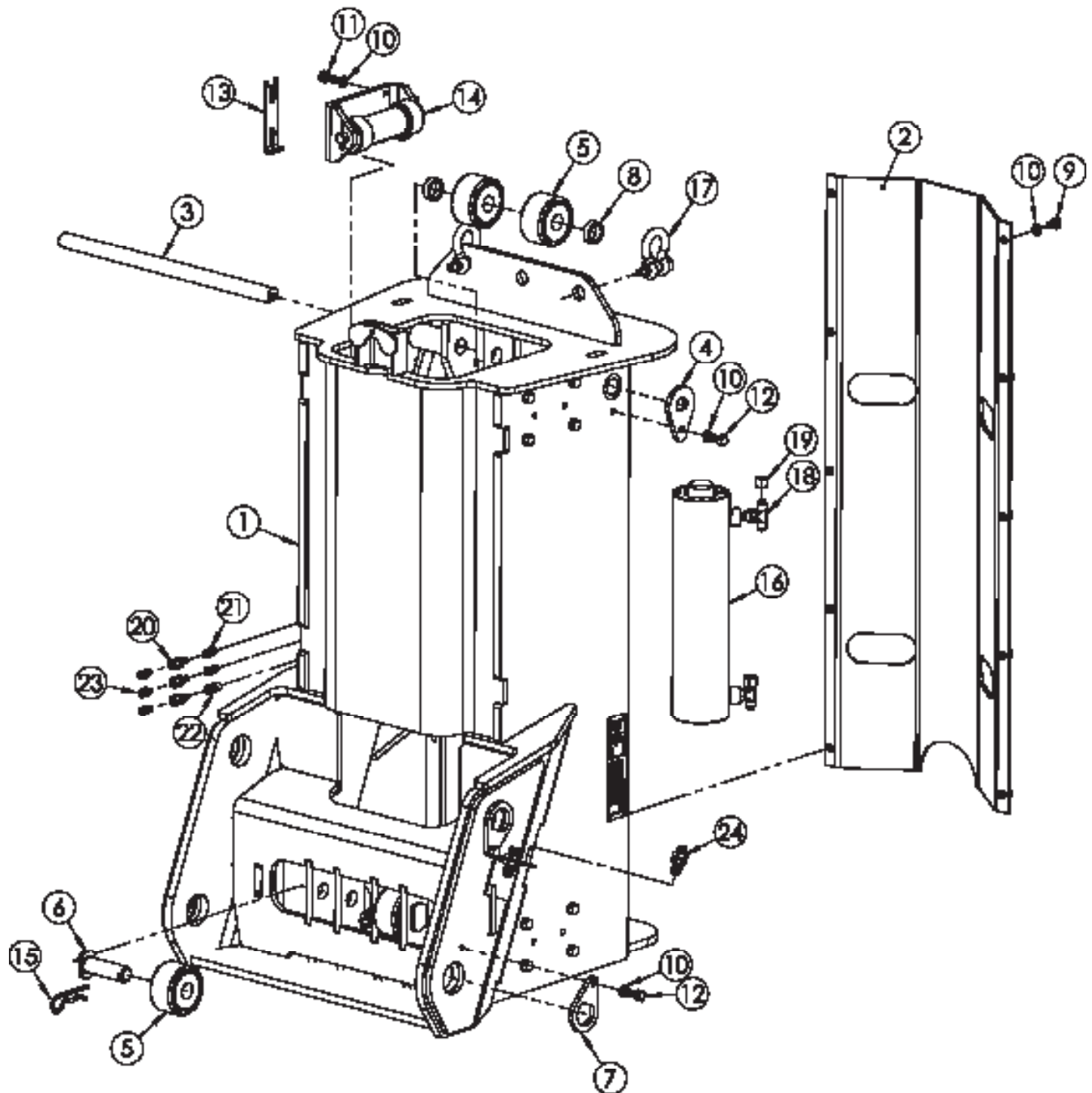
See pages 72-73 for adjustment information.

Previous models utilized a slave cylinder configuration.
See next pages for slave cylinder location, parts, and procedure.

51141 SYNCHRONIZATION ASSEMBLY

QTY	PART NUMBER	DESCRIPTION	QTY
1	21100	ENGINE OIL	1
1	21101	ENGINE OIL	1
1	21102	ENGINE OIL	1
1	21103	ENGINE OIL	1
1	21104	ENGINE OIL	1
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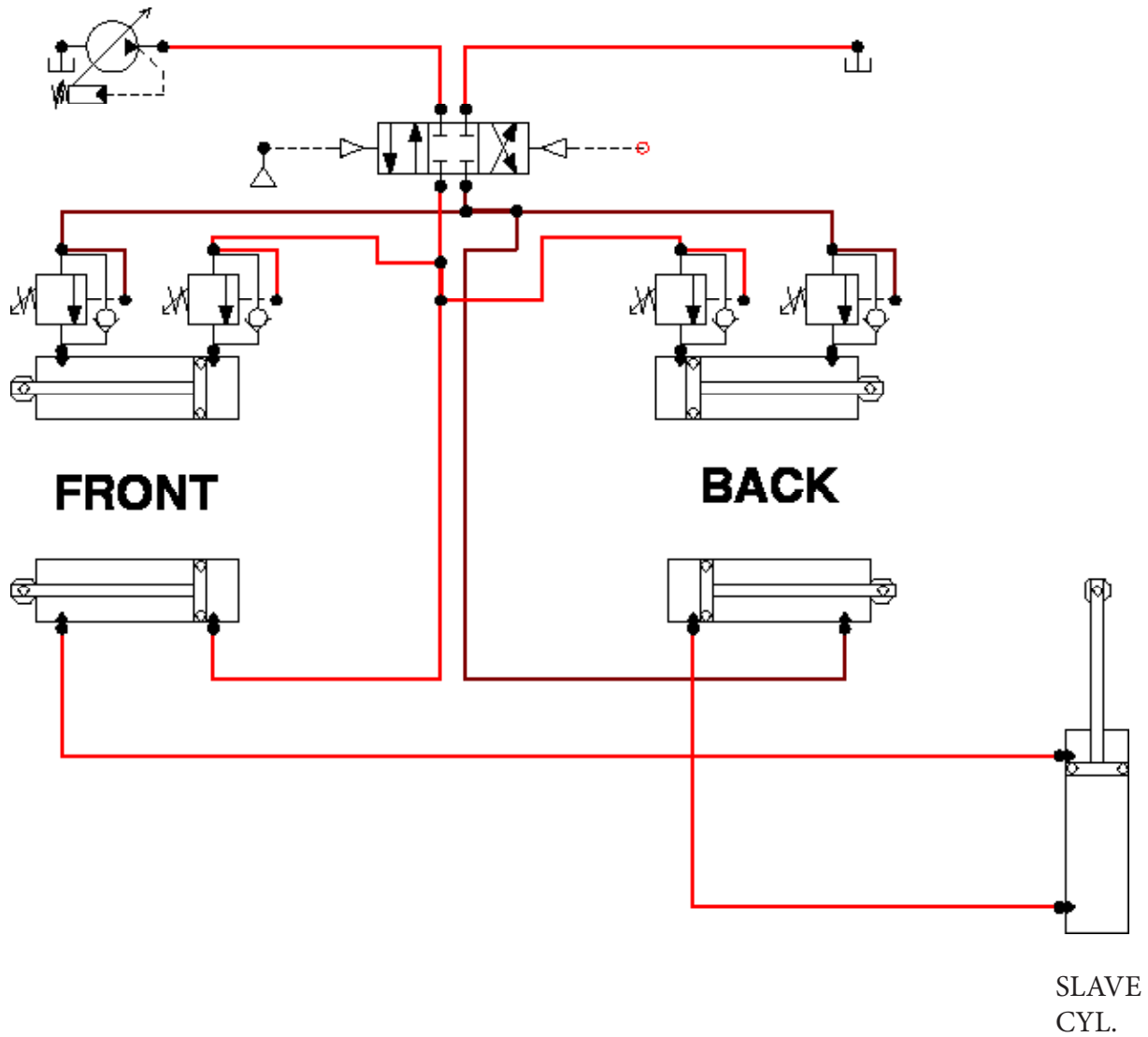
SLAVE CYLINDER CONFIGURATION



SLAVE CYLINDER CONFIGURATION

24	2041-8-8S	-8MJIC FLARE BULKHEAD	4
23	2045-2-2S	-2MNPT X -2FNPT FITTING STR. SWIVEL	3
22	2018-4-4S	-4MNPT X -4FJIC FITTING	1
21	2018-2-4S	-2MNPT X -4FJIC FITTING	2
20	2239-2-4S	-2FNPT X -4MJIC BULKHEAD FITTING	3
19	210292-8S	SAE -8 CAP NUT	2
18	6803-08-08-08	-8MORB X -8MJIC X -8MJIC T FITTING	2
17	G2130	5/8" SHACKLE	2
16	51259	CYLINDER, SLAVE	1
15	9B335A114	RETAINER, HAIRPIN	2
14	51040	ASSEMBLY, SIDE ROLLER	4
13	51396	SHIM, SIDE ROLLER	8
12	806246	1/2" -13 X 1.00 LG. HEX BOLT GRD.9	6
11	806268	1/2" -13 X 1.50 LG. HEX BOLT GRD.9	16
10	810703	1/2" LOCK WASHER	32
9	806239	1/2" -13 X .75 LG. HEX BOLT GRD.9	10
8	51293	SPACER, YOKE ROLLER	2
7	50986	KEEPER, SHAFT	4
6	51334	CLEVIS PIN, ROLLER	2
5	51283	ROLLER, YOKE	4
4	51335	KEEPER, SHAFT, 1-1/4	2
3	51291	SHAFT, TROLLEY	1
2	50985	COVER, BACK	1
1	51270	WELDMENT, TROLLEY	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

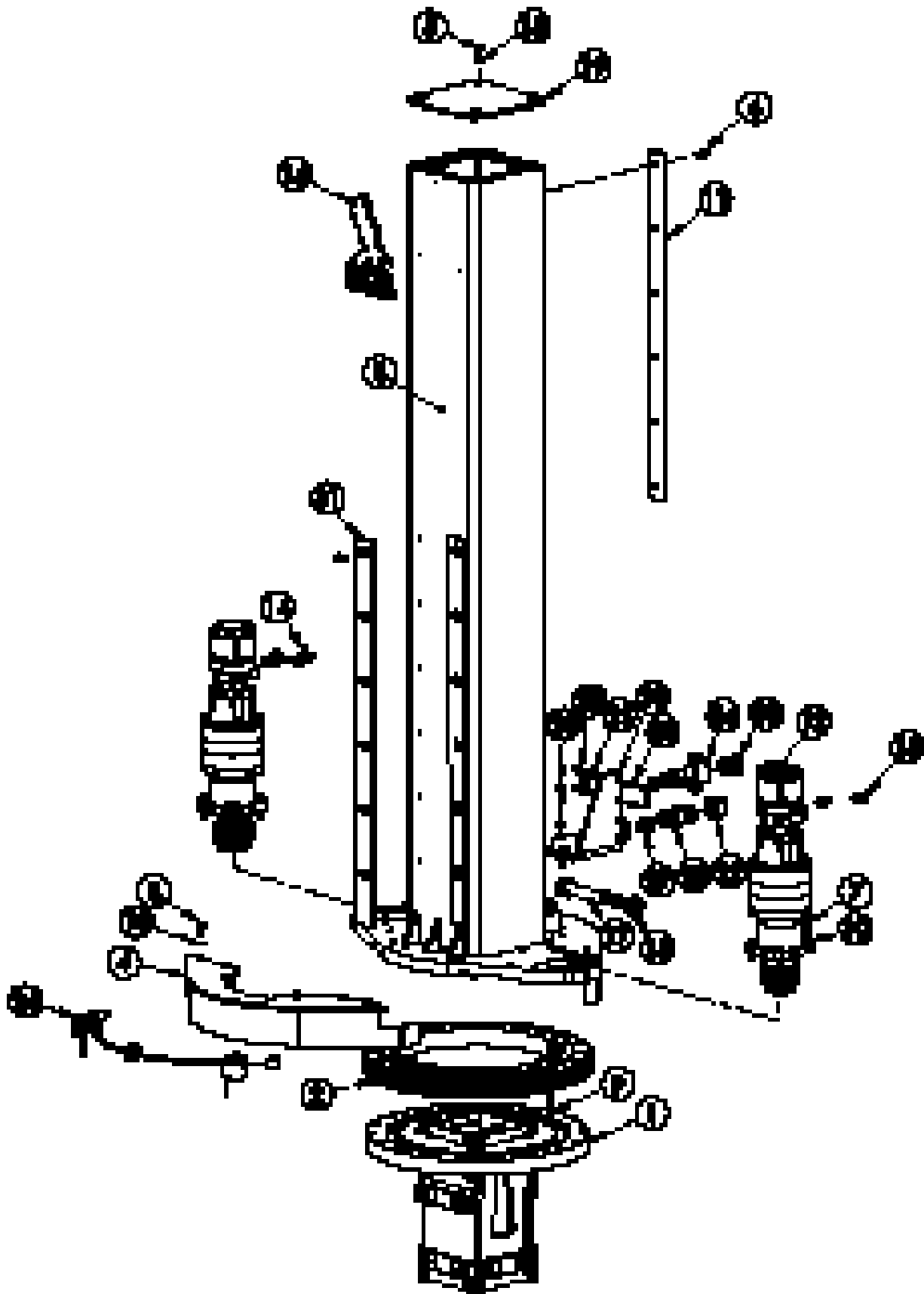
SLAVE CYLINDER CONFIGURATION



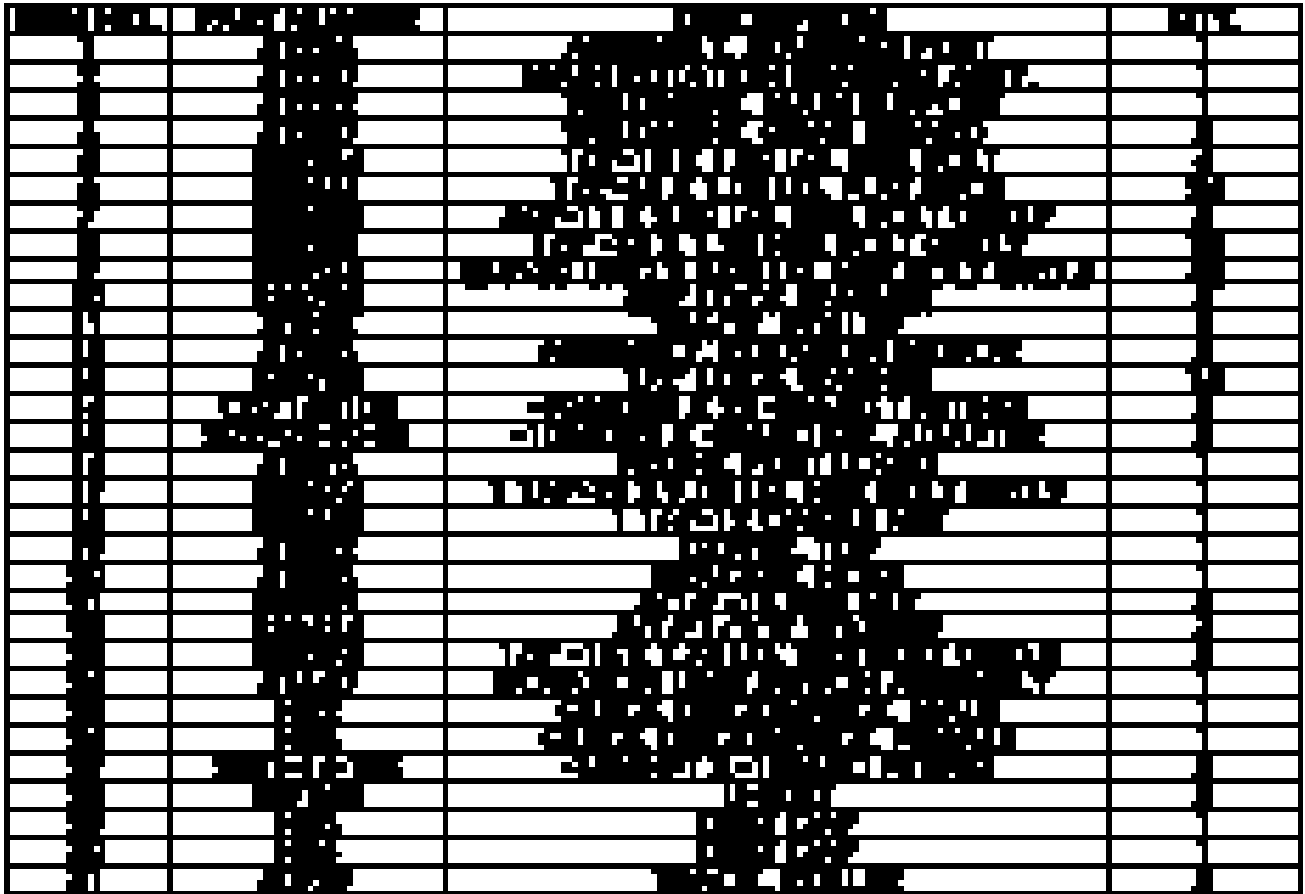
SLAVE CYLINDER CONFIGURATION

- (1) First the T-WREX should be FULLY extended using the manual control lever on the center section of the arm, under the cover.
- (2) Next, remove the rear cover to expose the lift cylinder and the slave cylinder.
- (3) Turn both the HPU and e-stop off. On the extension cylinders, remove the -8 caps on the tee fittings and connect jumper hoses between left and right cylinders, both in the front and rear sections of the arm.
- (4) Turn HPU back on. Raise the tool high enough that the front section can not hit the floor using the manual control lever on the center section of the arm.
- (5) Again using manual control on the arm, fully extend and retract the tool several times (six to ten). Leave the tool in the fully extended position and lower it fully.
- (6) Turn off the HPU again. Disconnect hoses from lift cylinder, marking them as to which fitting they connect to.
- (7) Using -8 to -6 adapters on the slave cylinder, connect lift hoses to tee fittings on the slave cylinder.
- (8) Using manual controls again, actuate the raise and lower valve, repeatedly (6 to 10) times, being careful to fully extend and retract the slave cylinder each time, but not holding the control long enough to cause the arm to begin to retract.
- (9) Leave the slave cylinder in the retracted position (opposite the extension cylinders, which should be fully extended at this point).
- (10) Turn the HPU off. Being careful to minimize oil loss and air intrusion, remove jumper hoses one at a time and cap tee fittings.
- (11) Remove lift hoses from slave one at a time and cap, to minimize air intrusion, and then reconnect lift hoses to the lift cylinder on the appropriate fittings.
- (12) Turn HPU and e-stop back on and verify that the extend and retract functions actuate smooth and level from the control console. Replace top and rear covers.

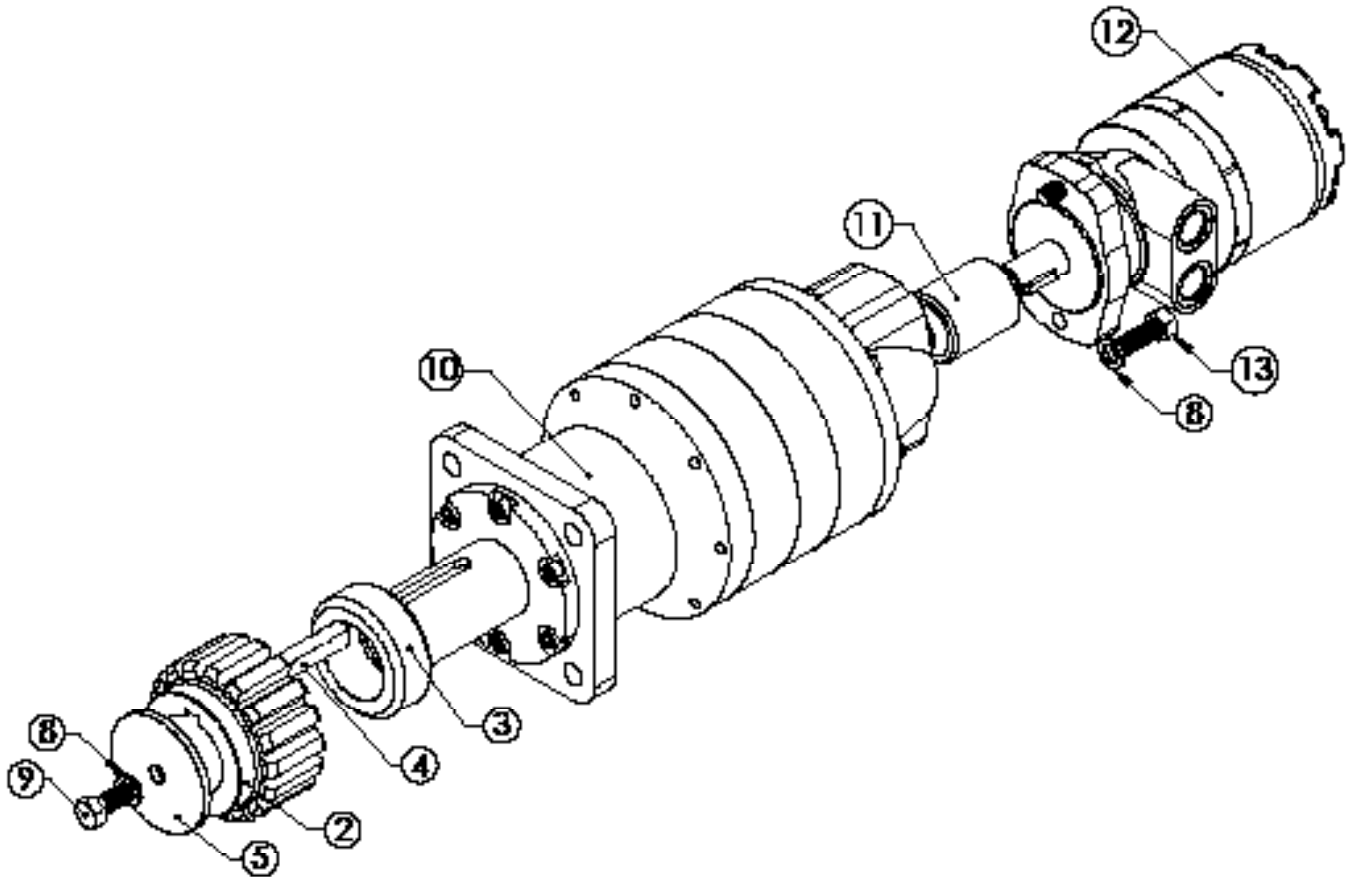
51210
MAIN SUPPORT ASSEMBLY



51210 MAIN SUPPORT ASSEMBLY



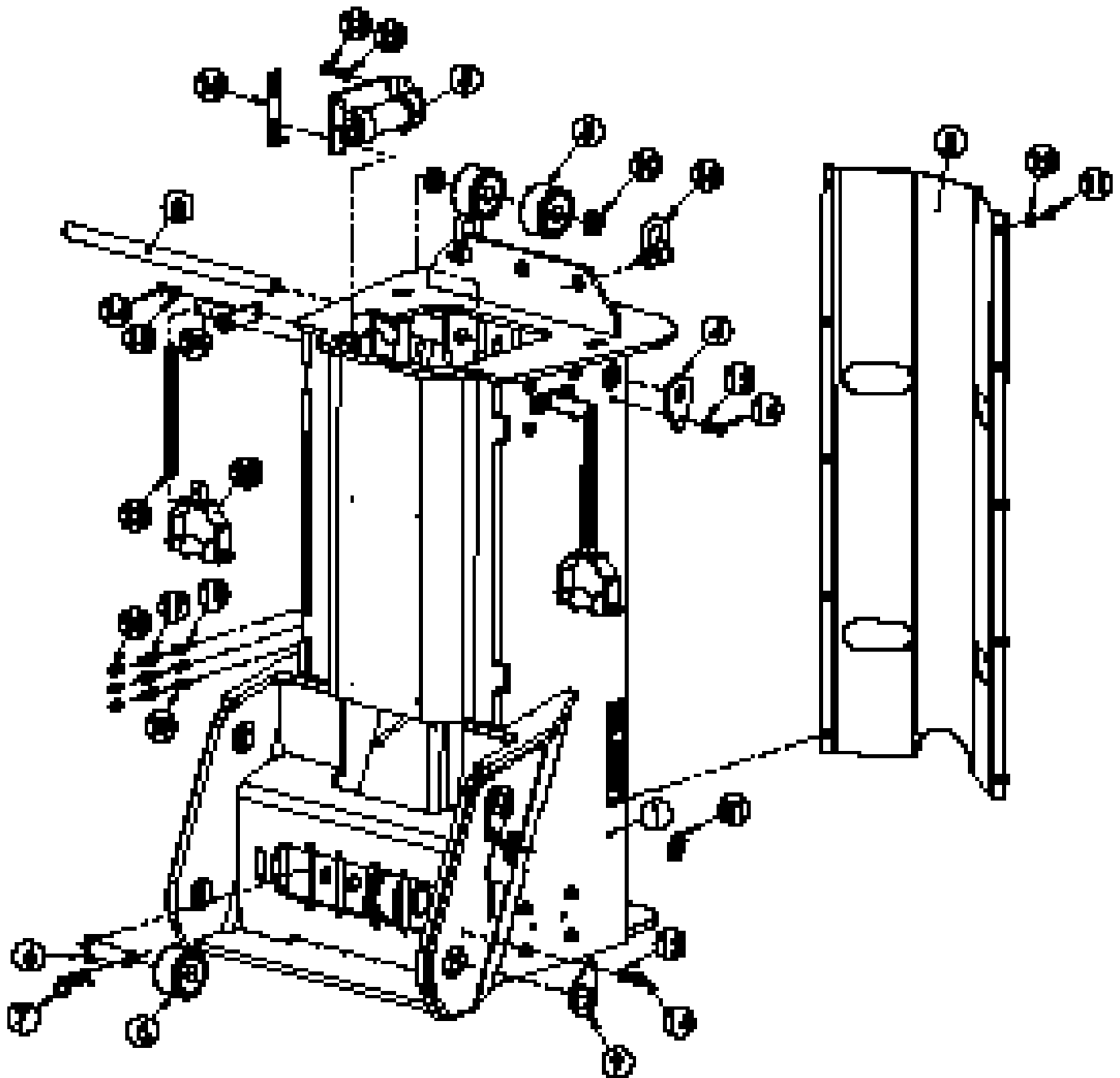
51235 ROTATION MOTOR



13	B06268	1/2"-13 X 1.50 LG. HEX BOLT GRD.9	2
12	T100	MOTOR, HYDRAULIC	1
11	160	SUN GEAR	1
10	51216	REDUCER, GEAR	1
9	B06374	1/2"-20 X 1.50 LG. HEX BOLT GRD.8	1
8	B10703	1/2" LOCK WASHER	3
5	51217	WASHER, GEAR SUPPORT	1
4	51218	JE GEAR KEY	1
3	51219	SPACER, GEAR	1
2	51221	GEAR, PINION, JE	1
ITEM NO	PART NUMBER	DESCRIPTION	QTY

NOTES:

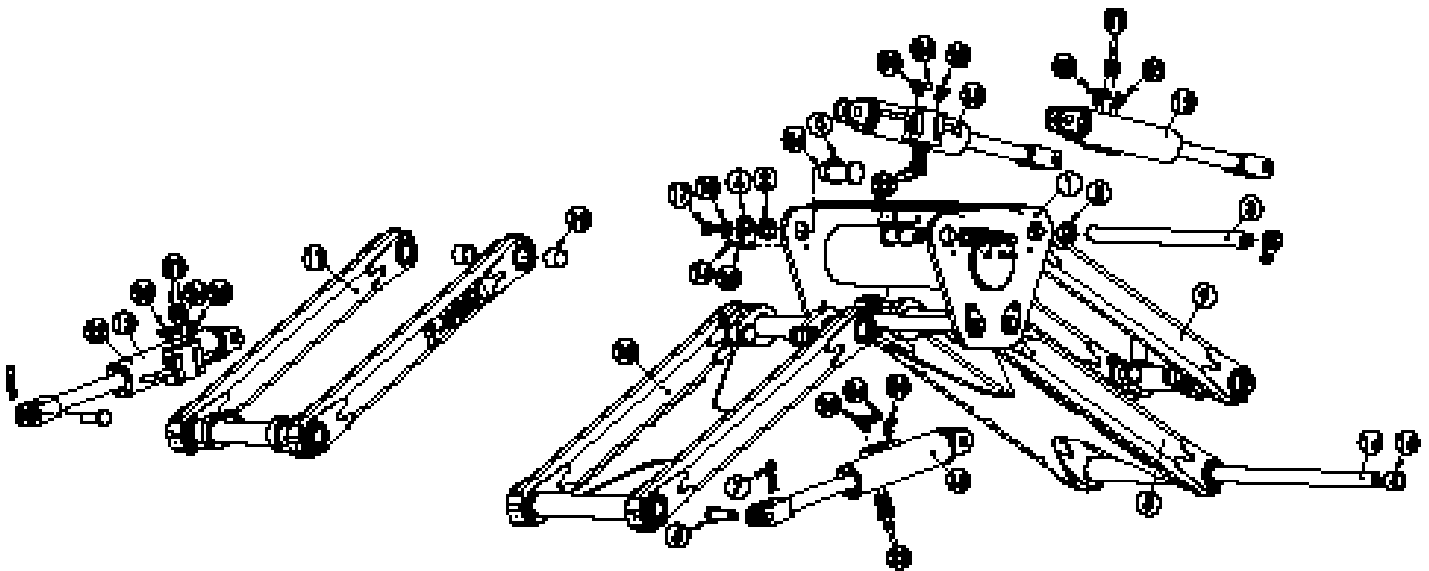
51211
TROLLEY ASSEMBLY



51211 TROLLEY ASSEMBLY

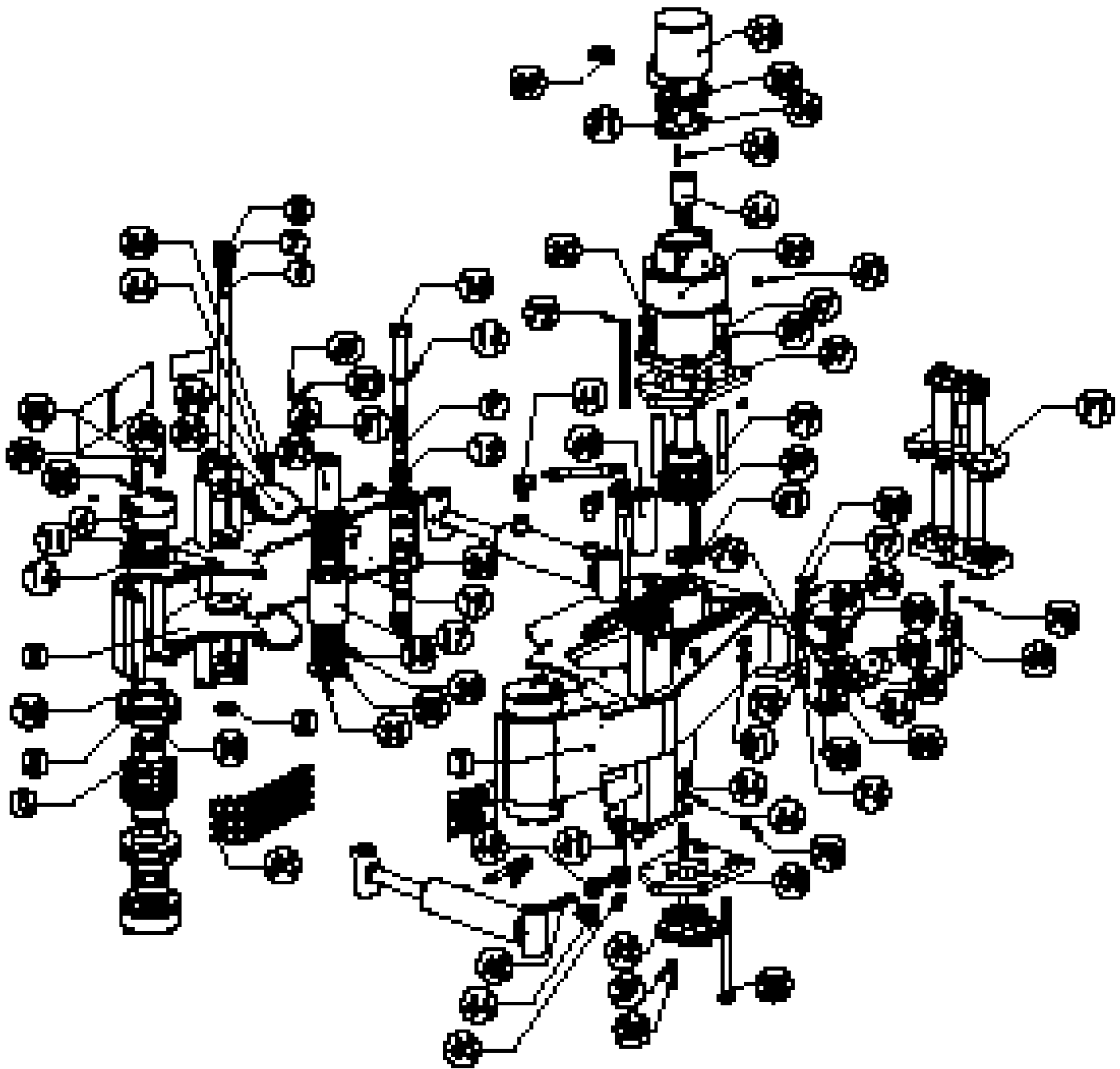
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51212
EXTEND/RETRACT ASSEMBLY

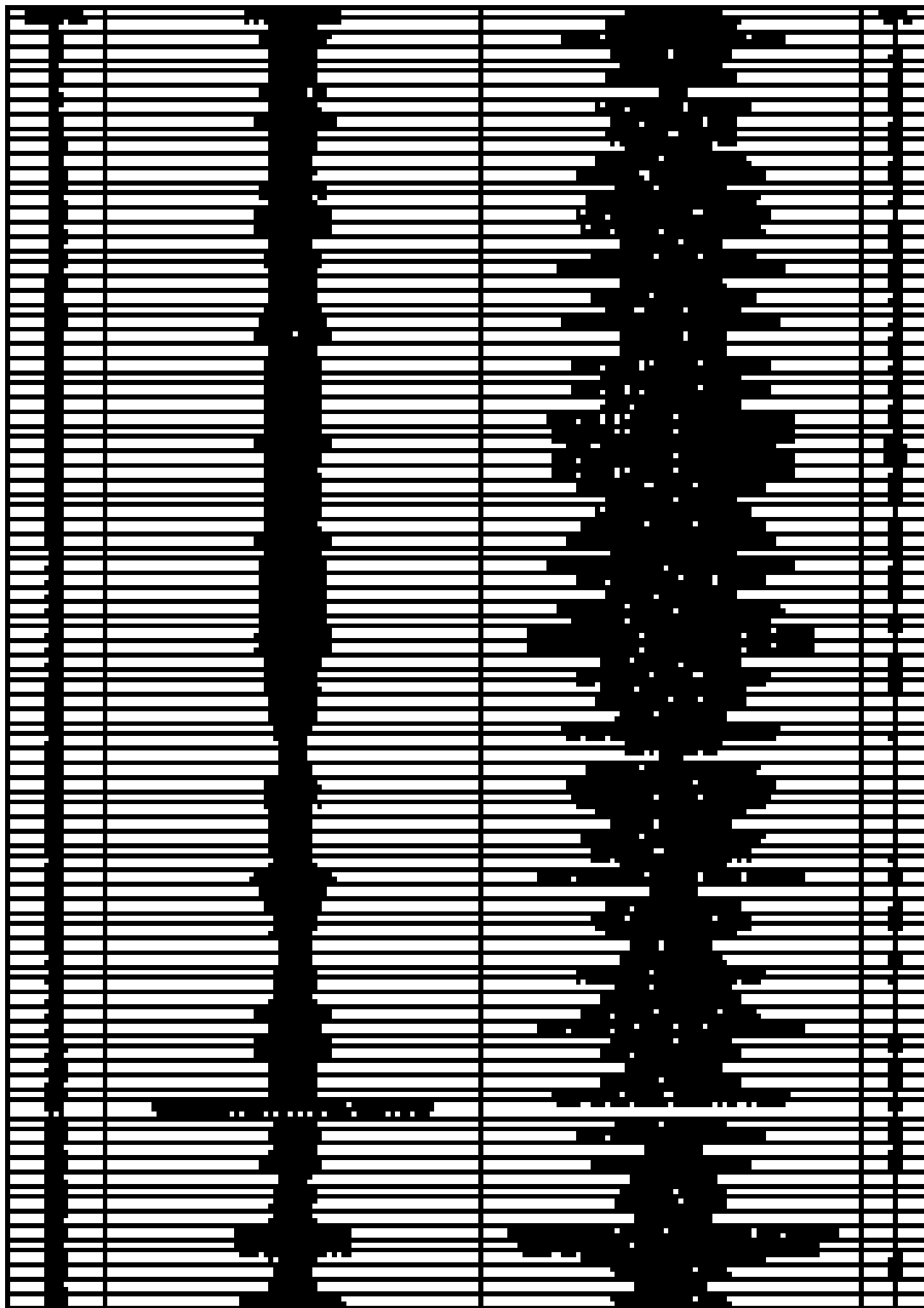




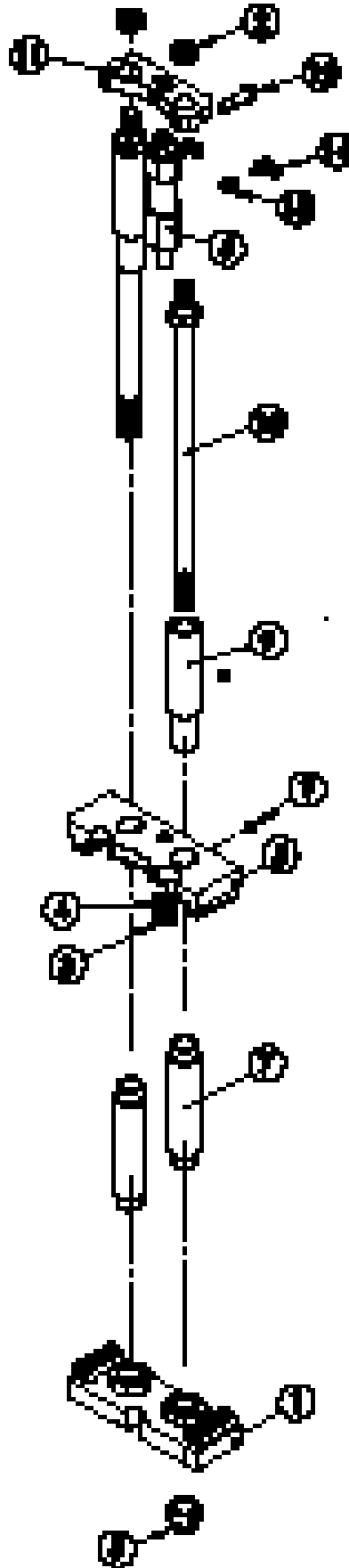
950TW
T-WREX SPINNER



950TW
T-WREX SPINNER



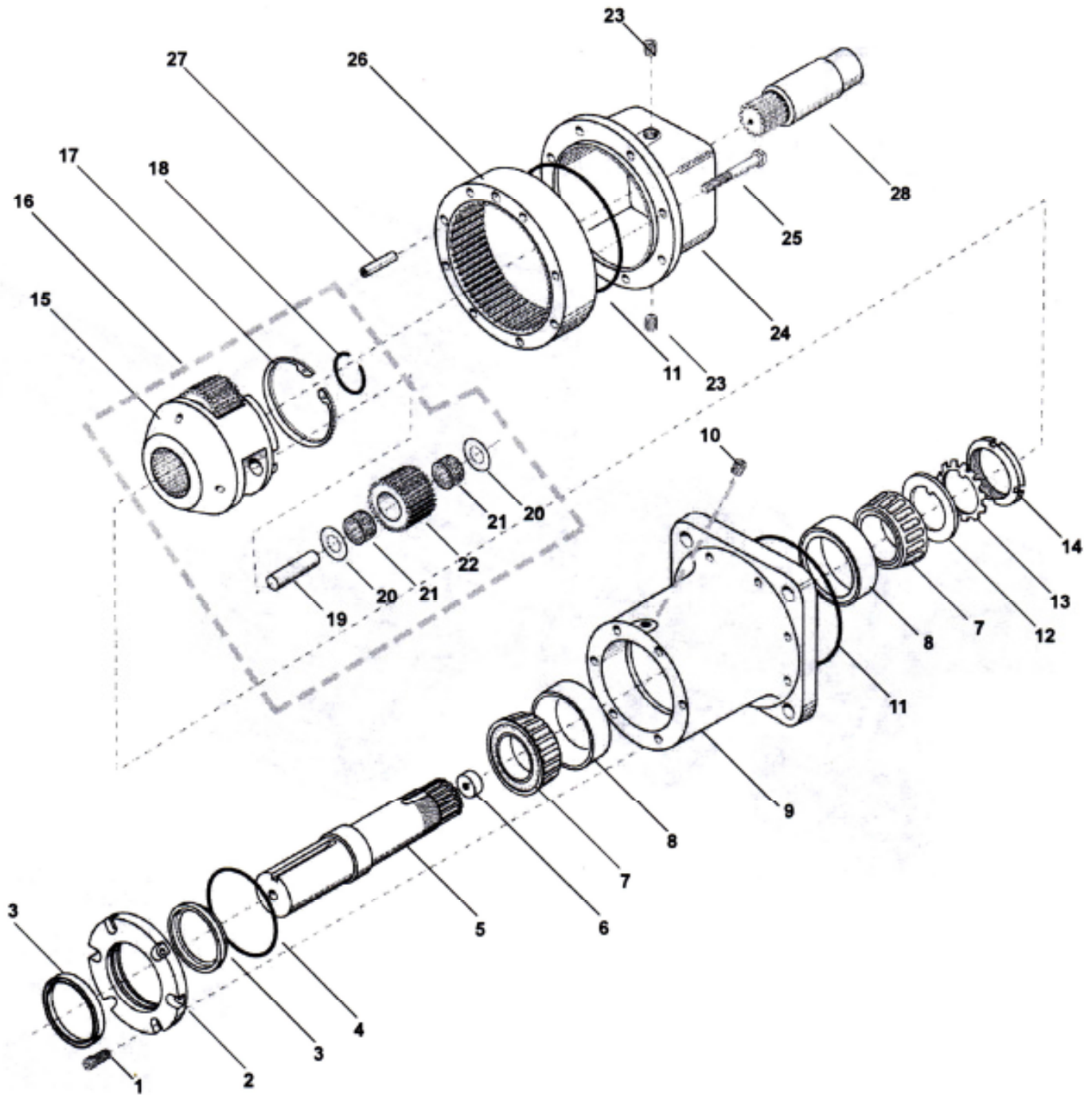
51160
MOTOR CLAMP ASSEMBLY



51160
MOTOR CLAMP ASSEMBLY



24625 SPINNER GEARBOX



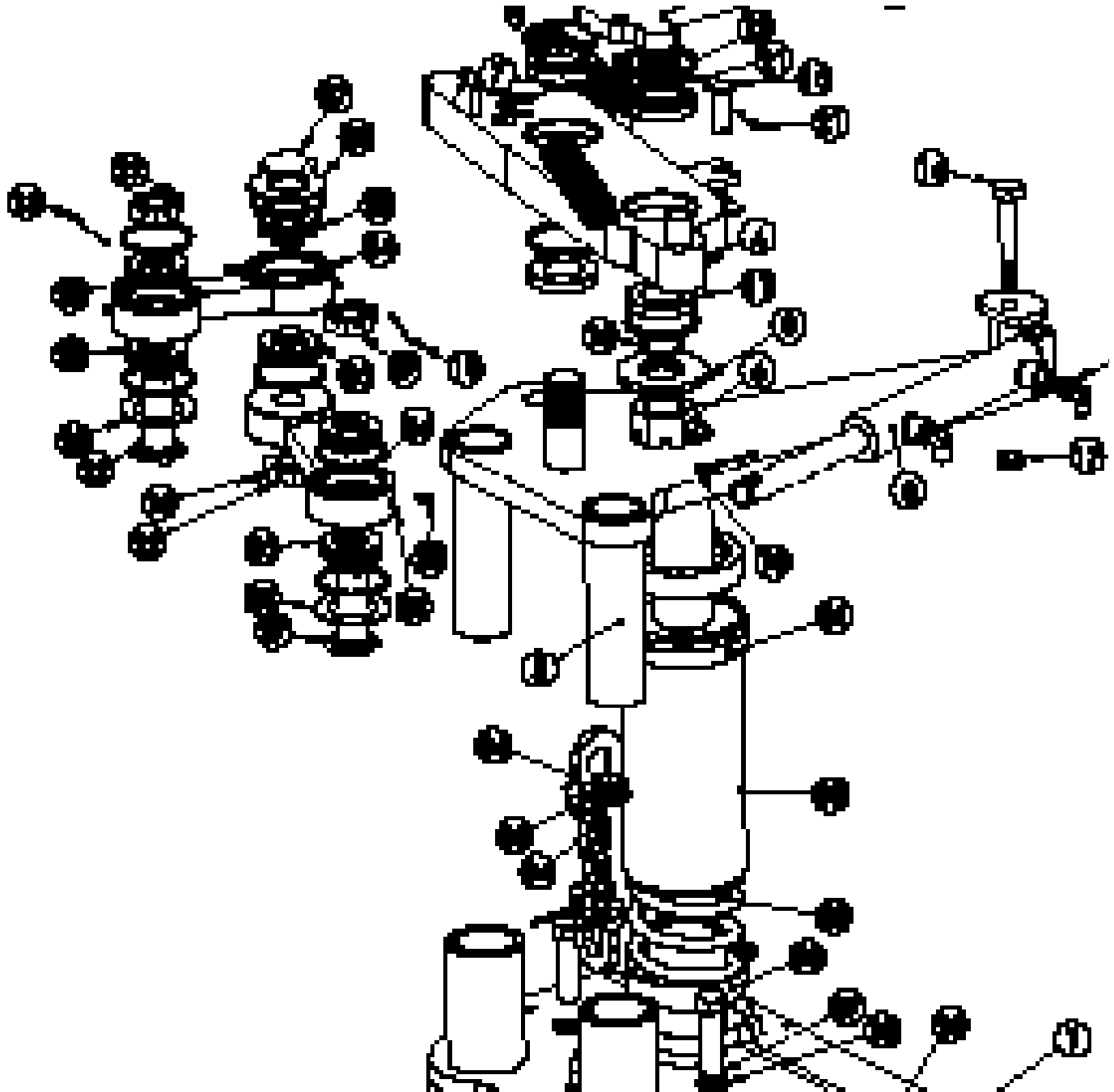
24625
SPINNER GEARBOX

30 ^{***}	031-R36	RETAINER RING	2
29 ^{***}	031-R35	PLANET PIN	1
28 ^{***}	031-R32	PLANET GEAR	1
27 ^{***}	031-R33	PLANET BEARING	2
26 ^{***}	031-R26	THRUST WASHER	2
25	031-R25	SUN GEAR KIT	1
24	031-R24	BOLT	8
23	031-R23	PIPE PLUG	2
22	031-R22	MOTOR ADAPTOR	1
21	031-R21	INTERNAL GEAR	1
20 ^{***}	031-R34	PLANET CARRIER	1
19	031-R19	LOCK NUT	1
18	031-R18	LOCK WASHER	1
17	031-R17	KEYED WASHER	1
16	031-R10/16	CONE	1
15	031-R11/15	CUP	1
14 [*]	031-R14	O RING	2
13	031-R13	PIPE PLUG	4
12	031-R12	BEARING HOUSING	1
11	031-R11/15	CUP	1
10	031-R10/16	CONE	1
9	031-R09	RETAINER RING	2
8	031-R08	THRUST WASHER	1
7	031-24707	OUTPUT SHAFT	1
6 [*]	031-R06	O RING	1
5 [*]	031-R05	QUAD RING	1
4 [*]	031-R04	BACK-UP RING	1
3 [*]	031-R03	SEAL CARRIER	1
2 [*]	031-R02	SHAFT SEAL	1
1 [*]	031-R01	CAP SCREW	6
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

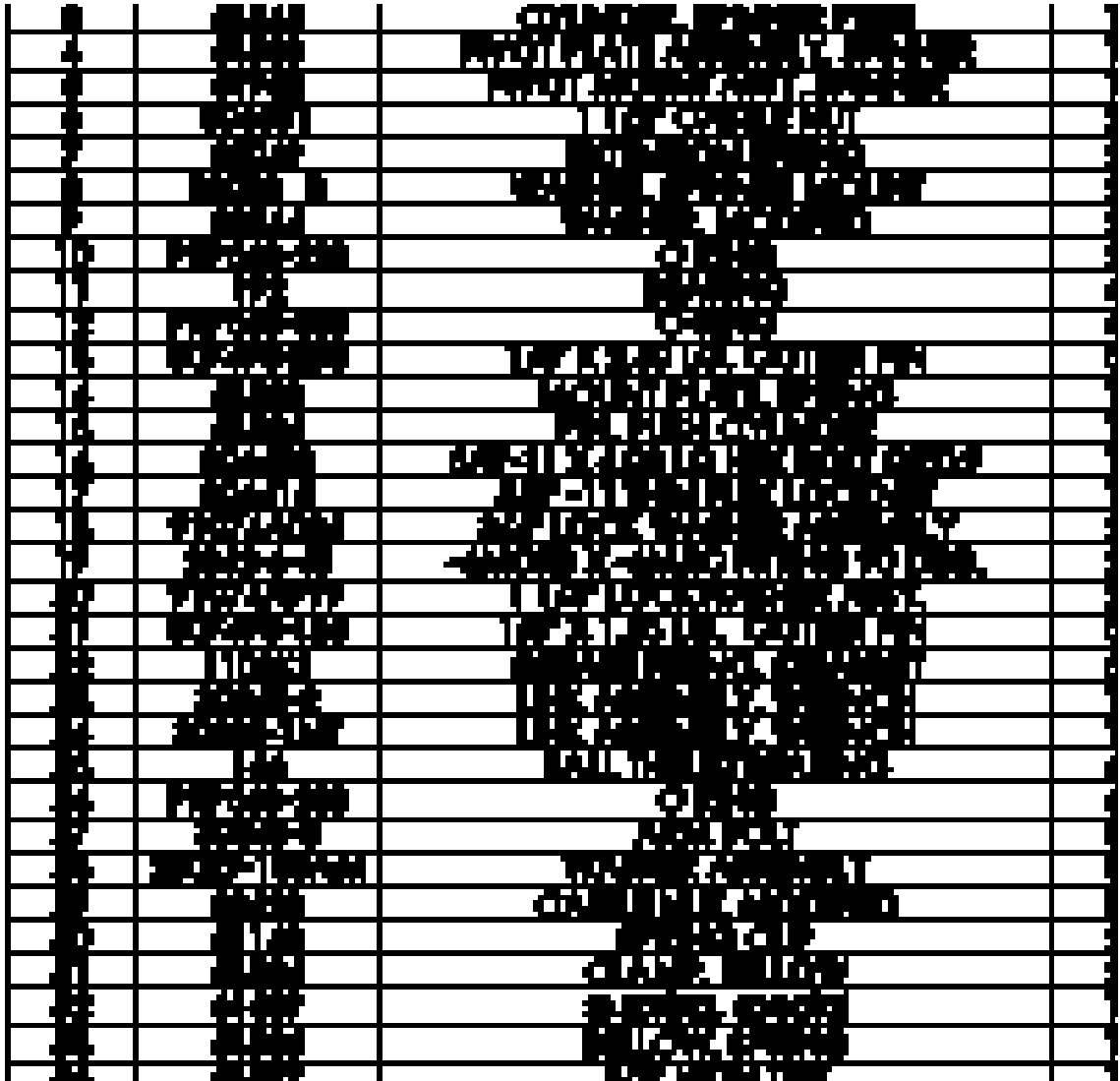
▪ - AVAILABLE ONLY IN KIT #031-24625-SRK

*** - AVAILABLE ONLY IN KIT #031-R31 PLANETARY ASSEMBLY KIT

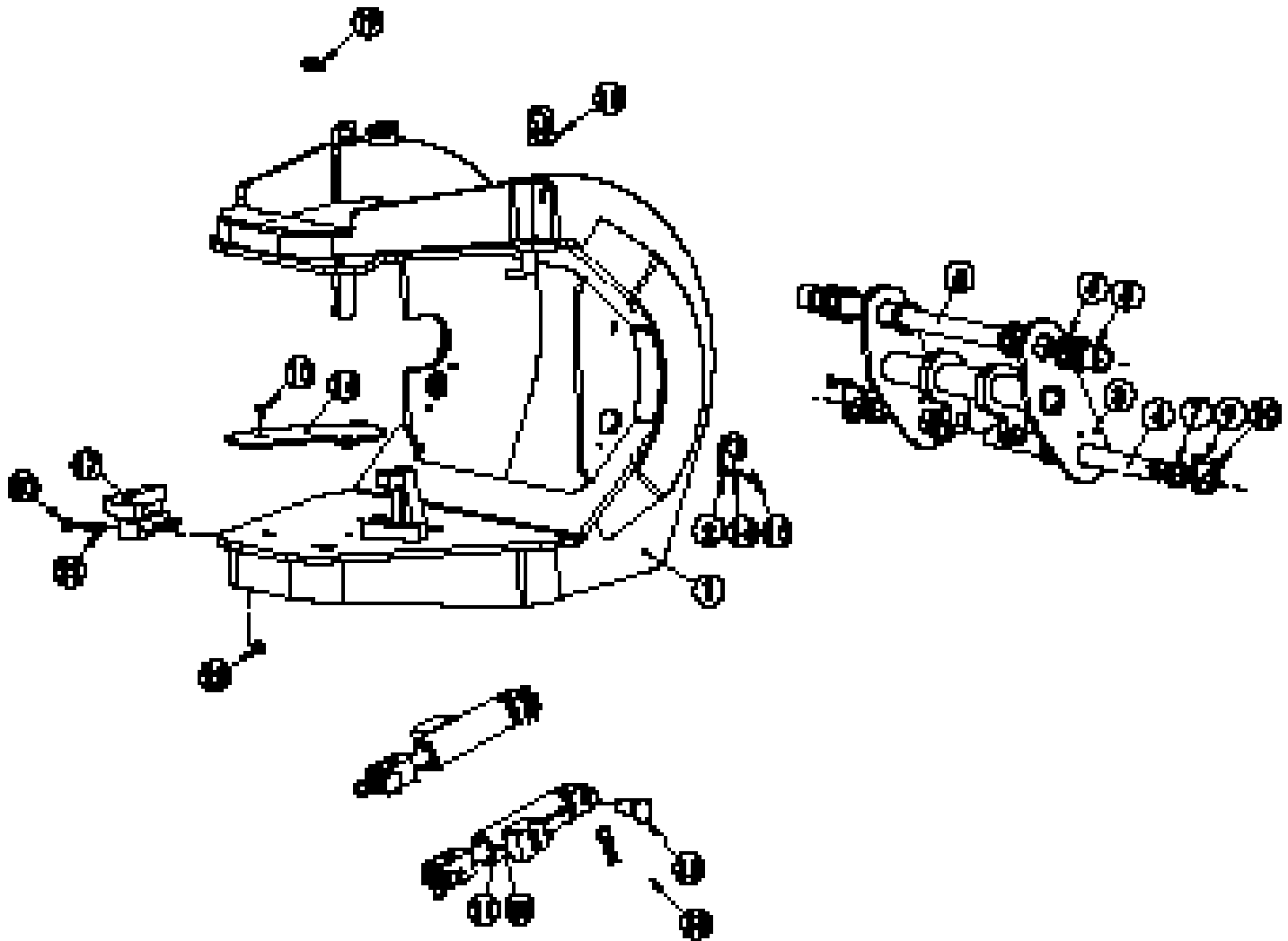
51300
SPINNER MOUNT



51300
SPINNER MOUNT



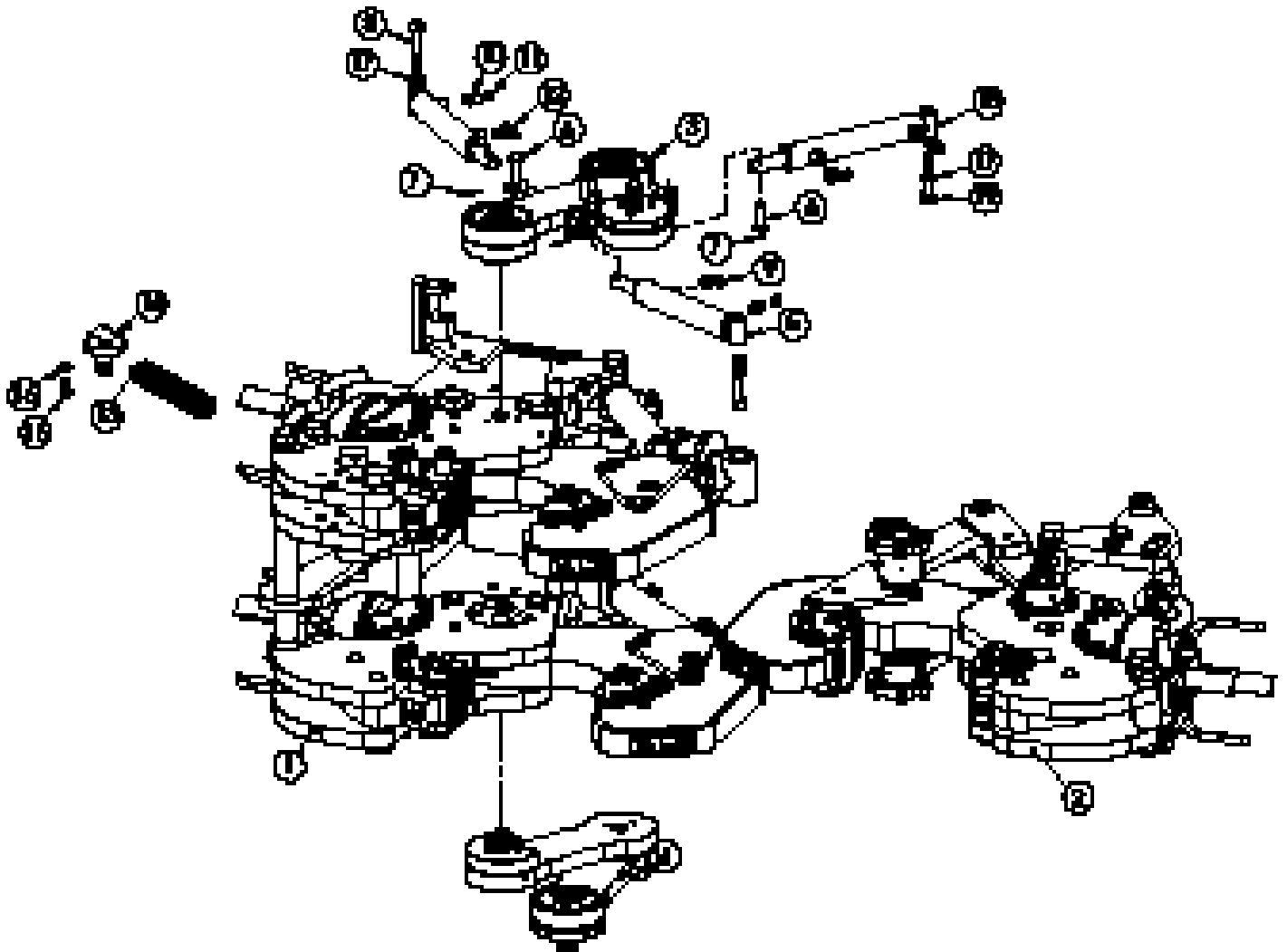
51701
C-HEAD ASSEMBLY



51701
C-HEAD ASSEMBLY

[illegible]

51750
WRENCH ASSEMBLY

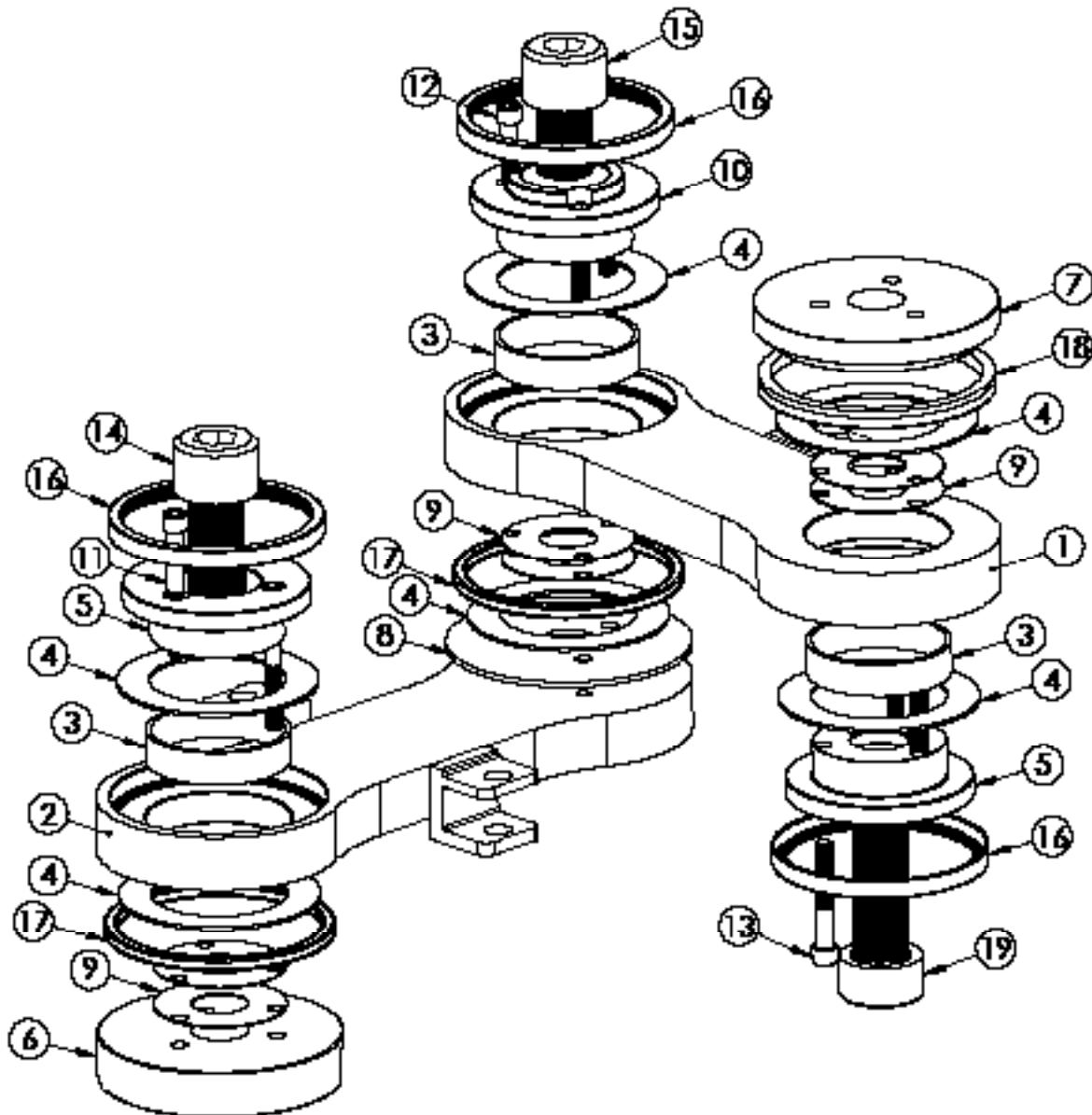


51750
WRENCH ASSEMBLY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	5071	ANVIL, TOP END WRENCH	1
2	5072	ANVIL, HANDLE WRENCH	1
3	5073	WRENCH, HANDLE END	1
4	5074	WRENCH, HANDLE END	1
5	5075	WRENCH, HANDLE END	2
6	5076	WRENCH, HANDLE END	2
7	5077	WRENCH, HANDLE END	2
8	5078	WRENCH, HANDLE END	2
9	5079	WRENCH, HANDLE END	1
10	5080	WRENCH, HANDLE END	2
11	5081	WRENCH, HANDLE END	2
12	5082	WRENCH, HANDLE END	2
13	5083	WRENCH, HANDLE END	1
14	5084	WRENCH, HANDLE END	1
15	5085	WRENCH, HANDLE END	2
16	5086	WRENCH, HANDLE END	2
17	5087	WRENCH, HANDLE END	2
18	5088	WRENCH, HANDLE END	1
19	5089	WRENCH, HANDLE END	1

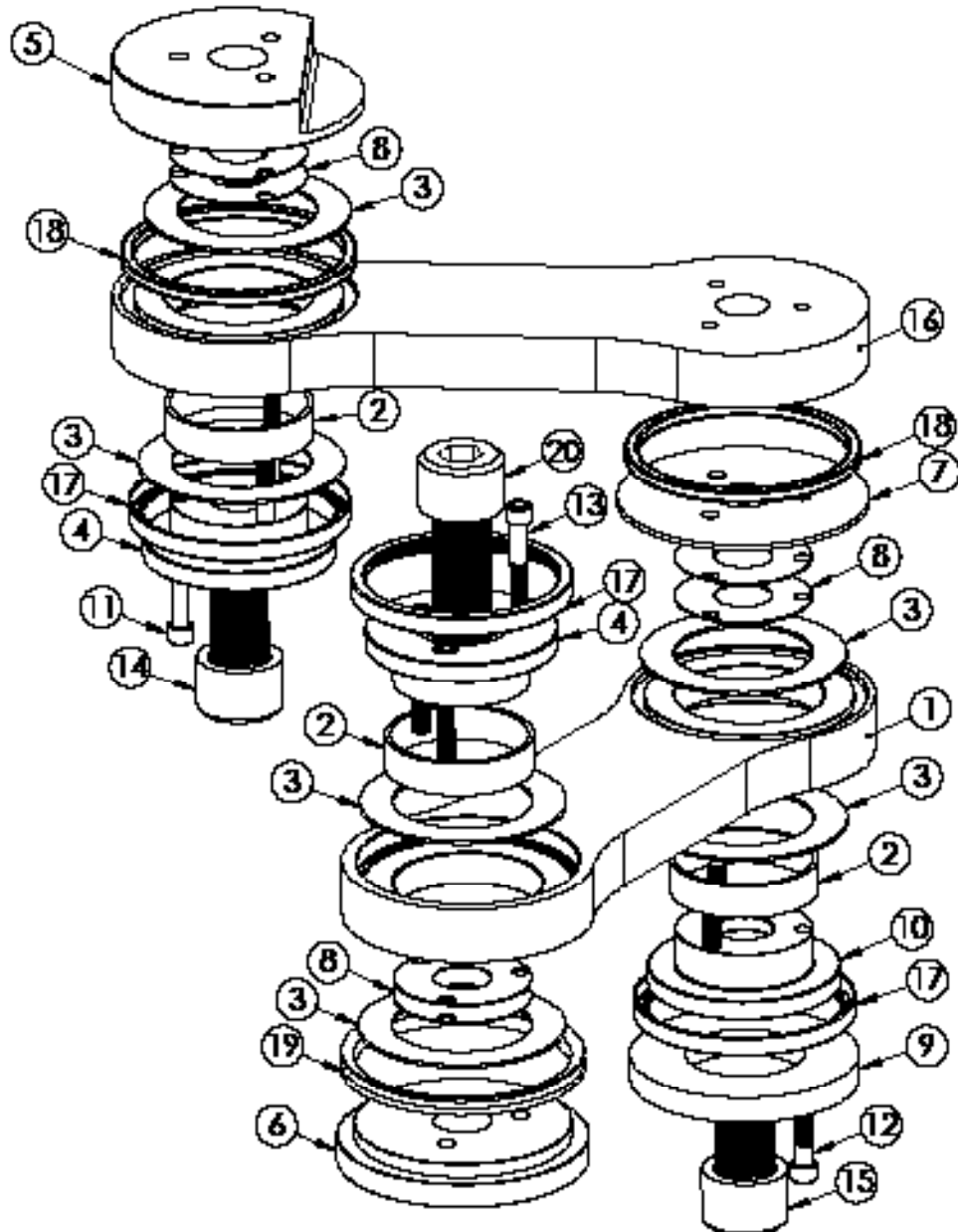
51114-UPPER

19	806677-4M	1 1/4"-12 X 3.25 LG. SHCS MODIFIED	
18	401200	V-SEAL	
17	90025K3/5	GUARD RING	2
16	42120	SEAL	3
15	806675	1 1/4"-12 X 1.75 LG. SHCS	
14	806676-3	1 1/4"-12 X 2.75 LG. SHCS	
13	808377	3/8"-16 X 2.50 LG. SHCS	3
12	808376-2	3/8"-16 X 2.00 LG. SHCS	3
11	808380	3/8"-16 X 3.00 LG. SHCS	3
10	51363	STEPPED RETAINER	
9	51112	SHIM	6
8	5108-125	SPACER	
7	5108-867	SPACER	
6	5111	ADAPTER	
5	51364	ID RETAINER, FLAT	2
4	5106	THRUST BEARING	6
3	51365	BUSHING, WRENCH LINK	3
2	51113	WELDMENT, LINKAGE	
1	51115	WELDMENT, UPPER LINKAGE	
ITEM NO.	PART NUMBER	DESCRIPTION	UPPER/QTY.



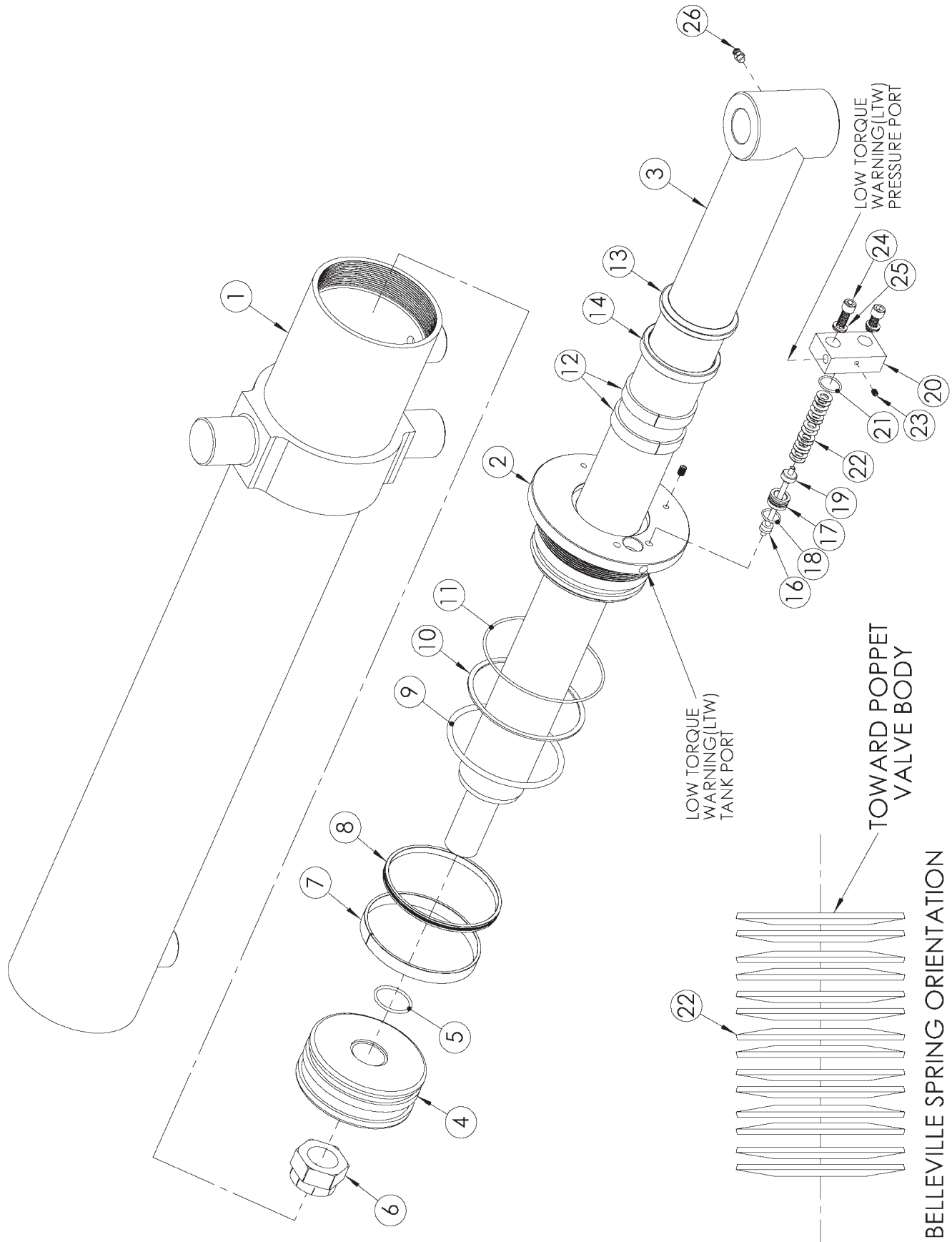
51114-LOWER

20	806677	BOLT, LINKAGE	1
19	401200	V-SEAL	1
18	90025K575	QUAD RING	2
17	42120	SEAL	3
16	51110	LINK, THREADED	1
15	806675	1 1/4"-12 X 1 1/5" LG. SHCS	1
14	806676-3	1 1/4"-12 X 2 7/5" LG. SHCS	1
13	808377	3/8"-16 X 2 5/10" LG. SHCS	3
12	808376-2	3/8"-16 X 2 0/10" LG. SHCS	3
11	808380	3/8"-16 X 3 0/10" LG. SHCS	3
10	51363	STEPPED RETAINER	1
9	51071	BUSHING, SLIDE	1
8	51112	SHIM	6
7	51108-129	SPACER	1
6	51108-627	SPACER	1
5	51111	ADAPTER	1
4	51364	ID RETAINER, FLAT	2
3	51106	THRUST BEARING	6
2	51365	BUSHING, WRENCH LINK	3
1	51109	LINK	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.



H17-TW

T-WREX SR. TORQUE CYLINDER ASSEMBLY



H17-TW T-WREX SR. TORQUE CYLINDER ASSEMBLY

27	061-J20-RK*	SEAL KIT	
26	1103K1	GREASE FITTING, STRAIGHT	1
25	91074A030	ASSEMBLY, 5/16" LOCK WASHER	2
24	805959	5/16" - 24 x .75 LG. SHCS	2
23	809396-1	#10-32 X .25 SOC. HD. SET SCREW SS	1
22	022S	SPRING, BELLVILLE	14
21	PRP568-018	O-RING, POPPET VALVE BODY	1
20	30065	BODY, POPPET VALVE	1
19	30064**	PIN, POPPET	1
18	PRP568-016	O-RING, POPPET SEAT	1
17	20238**	SEAT, POPPET	1
16	LTW-RK	U CUP, POPPET PIN	1
15	20341	1/4"-28 X .38 LG. SOC.HD SET SCREW	2
14	17631*	SEAL	1
13	12904*	WIPER	1
12	30420*	WEAR RING	2
11	10904*	O-RING	1
10	10237*	BACK-UP	1
9	10236*	O-RING	1
8	11963*	SEAL	1
7	30218*	WEAR RING	1
6	20011	LOCKNUT	1
5	10418*	O-RING	1
4	73225	PISTON	1
3	5C475	ROD ASSY.	1
2	7AO53	HEAD	1
1	4X430-TW	WELDMENT, BODY, TORQUE CYLINDER, SR	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

*SEALS ARE ONLY AVAILABLE IN SEAL KIT #061-J20-RK

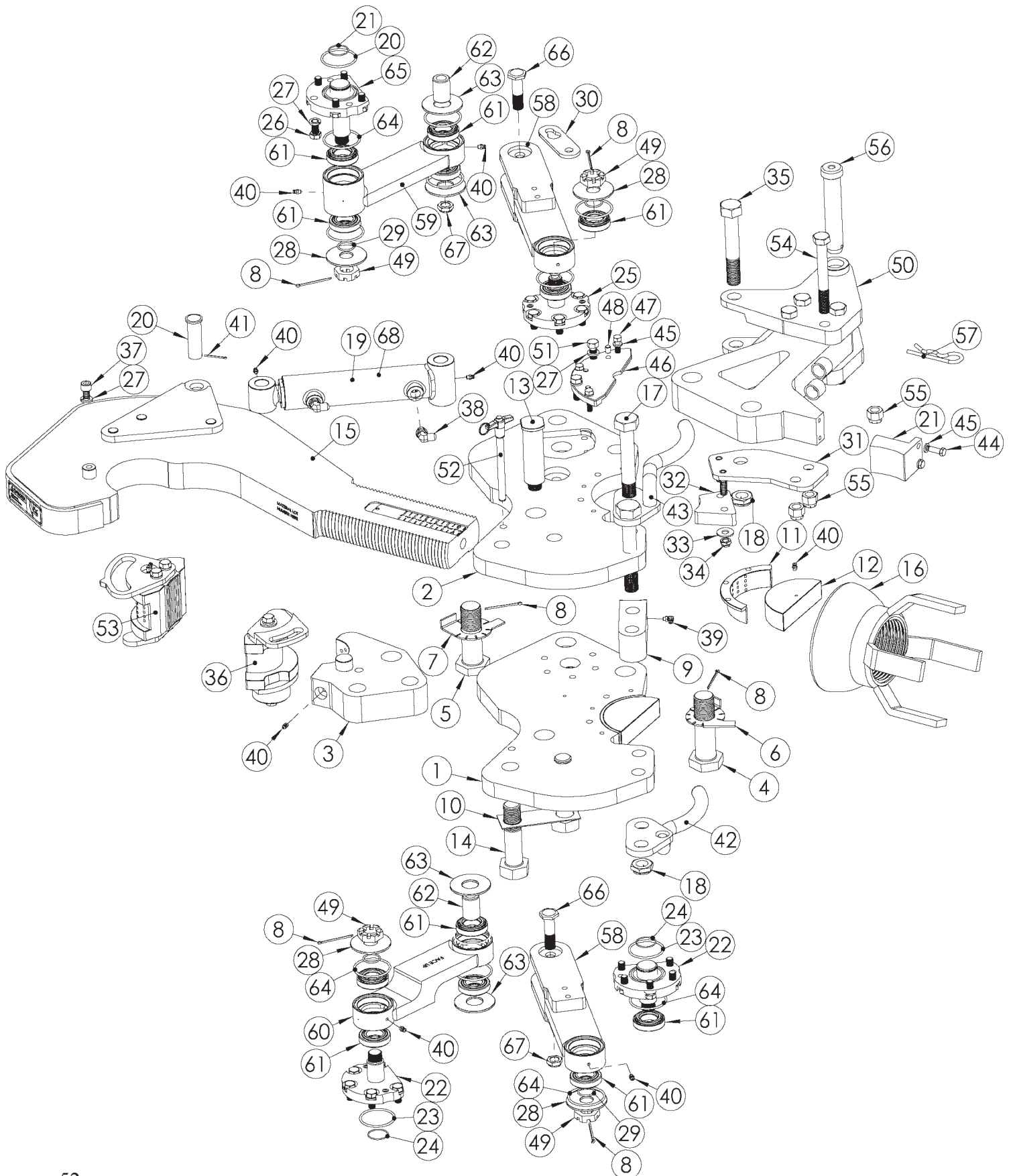
** - ONLY AVAILABLE IN KIT #061-LTW-P/S

50

TOP AND BOTTOM WRENCH ASSEMBLY

64	H18S-RK	REPAIR KIT GRIP CYLINDER	
63	J20-RK	REPAIR KIT TORQUE CYLINDER	
62	51715	WELDMENT, LOWER TORQUE CYLINDER MOUNT	1
61	51714	WELDMENT, UPPER TORQUE CYLINDER MOUNT	1
60	806297	1/2"-13 X 2.50 LG. HEX BOLT GRD.9	1
59	20208	SPACER BUSHING, ROLLER	1
58	20210	ROLLER ASSEMBLY	1
57	2047-2-2S	-2MNPT X -2FNPT SWIVEL 90 DEG.	2
56	900598-12S	-12S MORB PLUG	1
55	2062-12-8S	-12MORB X -8MJIC FITTING 90 DEG.	2
54	808413	1/2" - 13 x .75 LG. SHCS	2
53	51711-TB	HOOK DIE HOLDER, TOP & BOTTOM	2
52	H17-TW	TORQUE CYLINDER	1
51	1103K1	GREASE FITTING, STRAIGHT	10
50	806529	3/4" - 16 x 1.75 LG. HEX BOLT GRD. 9	8
49	810703	1/2" LOCK WASHER	11
48	806374	1/2"-20 X 1.50 LG. HEX BOLT GRD.8	8
47	51774	STOP ASSY, MIDDLE WRENCH	1
46	20078	JAW CRADLE ASSY.	2
45	20076-1A	CYLINDER MOUNT	1
44	98381A619	3/8" X .50 LG. DOWEL PIN	12
43	806026	3/8"-16 X 1.50 LG. HEX BOLT GRD.9	12
42	50196	RETAINER CAP	4
41	810645	3/8" LOCK WASHER	16
40	50234-7	WELDMENT, NUT RETAINER	2
39	50234-6	WELDMENT, NUT RETAINER	2
38	50209-BOT	HEEL DIE HOLDER ASSEMBLY, BOTTOM	1
37	90293A419	T- HANDLE PIN 5" LG.	2
36	50209-TOP	HEEL DIE HOLDER ASSEMBLY, TOP	1
35	807493-250	1/8" X 2.50 LG. COTTER PIN	4
34	98401A446	3/32" X 1.50 LG. COTTER PIN	2
33	1103K3	GREASE FITTING, 90 DEG.	8
32	2062-6-6S	-6MORB X -6MJIC FITTING 90 DEG.	4
31	806628	1" - 14 x 5.50 LG HEX BOLT GRD. 9	2
30	806594-500	1.00" -14 FLEX NUT	6
29	806012	3/8"-16 X 1.00 LG. HEX BOLT	4
28	806632	1" -14 X 6.50 LG. HEX BOLT GRD.9	4
27	50216	HEX BOLT, MODIFIED	4
26	20269	LOCK PLATE	2
25	50218	BOLT, WRENCH	2
24	50218-2	BOLT, WRENCH	2
23	91074A038	1.00" LOCK WASHER ASSY.	6
22	30118	ANGLE BRACKET BOLT, LARGE	4
21	30117	ANGLE BRACKET BOLT, SMALL	4
20	91074A036	3/4" LOCK WASHER ASSEMBLY	12
19	20289-2A	LOCK PLATE, WRENCH BOLT	2
18	20289-1A	LOCK PLATE, WRENCH BOLT	2
17	91259A118	5/8 x .50 LG. SHOULDER BOLT	2
16	20258	BUMPER, TORQUE CYLINDER	1
15	20270	HOOK PIN	2
14	50217	SHOULDER BOLT	2
13	50234	WEAR INSERT	4
12	H18S	GRIP CYLINDER	1
11	H18S	GRIP CYLINDER	1
10	50200	STOP, NUT	2
9	50188	ASSEMBLY, ADJUST NUT	2
8	50002	ASSEMBLY, HOOK	2
7	50072	PLATE, NUT BEARING	2
6	50198	PIVOT PIN	4
5	50004-1B	JAW PLATE, MACHINED	1
4	50004-1A	JAW PLATE, MACHINED	1
3	50004-3A	JAW PLATE, MACHINED	1
2	50004-3B	JAW PLATE, MACHINED	1
1	50145	ASSEMBLY, BASE PLATE	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

51752 MIDDLE WRENCH ASSEMBLY

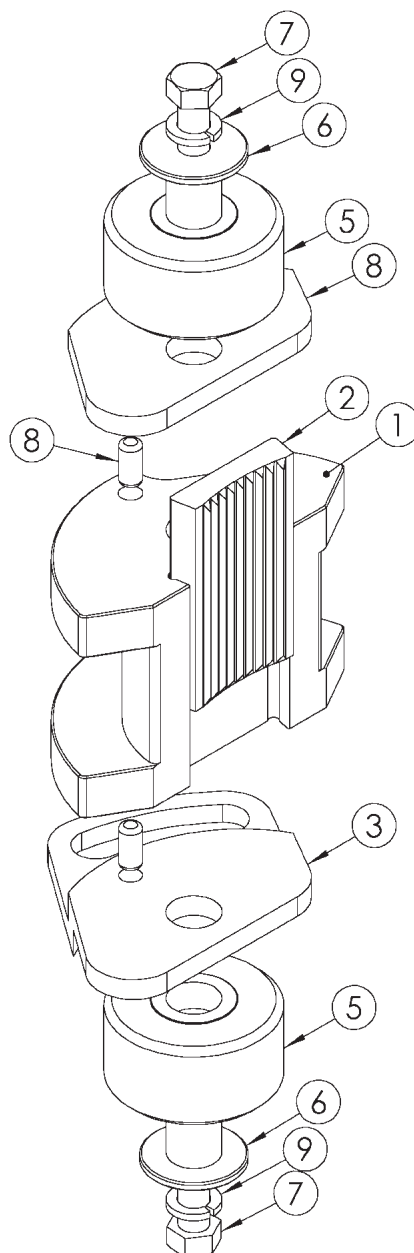


MIDDLE WRENCH ASSEMBLY

68	H18S-RK	REPAIR KIT GRIP CYLINDER	
67	806523	3/4" - 16 FLEX NUT	2
66	20214-2A	BOLT, MODIFIED	2
65	20028-362	PIN, LINKAGE MOUNT ASSEMBLY	1
64	PRP568-230	O RING	12
63	20029-138	WASHER	4
62	20038	PIVOT BUSHING	2
61	670	BEARING	12
60	50024-1	STEPPED LINKAGE ARM ASSEMBLY	1
59	50024	LINKAGE ASSEMBLY	1
58	50016	SPLIT LINKAGE ASSY.	2
57	98335A114	RETAINER, HAIRPIN	1
56	20204A	TORQUE CYLINDER PIN	1
55	806524	3/4"-16 FLEX LOCKNUT	4
54	806545	3/4"-16 X 6.00 LG. HEX BOLT GRD.9	4
53	51711-MID	HOOK DIE HOLDER ASSEMBLY, MIDDLE	1
52	90293A419	T- HANDLE PIN 5" LG.	1
51	806374	1/2" -20 X 1.50 LG. HEX BOLT GRD.8	4
50	20008	BASE PLATE, MOVING ASSY- WELDED	1
49	20229A	NUT, LINKAGE	4
48	98381A619	3/8" X .50 LG. DOWEL PIN	6
47	806026	3/8"-16 X 1.50 LG. HEX BOLT GRD.9	6
46	50196	RETAINER CAP	2
45	810645	3/8" LOCK WASHER	8
44	806012	3/8"-16 X 1.00 LG. HEX BOLT	2
43	50234-7	WELDMENT, NUT RETAINER	1
42	50234-6	WELDMENT, NUT RETAINER	1
41	98401A446	3/32" X 1.50 LG. COTTER PIN	1
40	1103K1	GREASE FITTING, STRAIGHT	11
39	1103K3	GREASE FITTING, 90 DEG.	3
38	2062-6-6S	-6MORB X -6MJIC FITTING 90 DEG.	2
37	808413	1/2" - 13 x .75 LG. SHCS	1
36	50209-MID	HEEL DIE HOLDER ASSY, MIDDLE	1
35	806630	1" - 12 X 6.00 LG. HEX BOLT	1
34	806221	1/2"-13 FLEX LOCKNUT	2
33	810705	1/2" FLAT WASHER	2
32	20010-4	BUMPER	1
31	50010-5	ASSEMBLY, RESET BUMPER	1
30	50025	RETAINER, SPRING	1
29	PRP568-122	O-RING	4
28	20029	WASHER	4
27	810703	1/2" LOCK WASHER	25
26	806369	1/2"-20 X 1.00 LG. HEX BOLT GRD.9	20
25	20028-245	PIN, LINKAGE MOUNT ASSEMBLY	1
24	PRP568-028	O-RING	3
23	PRP568-229	O-RING	3
22	20028-245B	PIN, LINKAGE MOUNT ASSEMBLY	2
21	50200	STOP, NUT	1
20	20270	PIN, HOOK	1
19	H18S	GRIP CYLINDER	1
18	806594-500	1.00" -14 FLEX NUT	4
17	806632	1" -14 X 6.50 LG. HEX BOLT GRD.9	2
16	50188	ASSEMBLY, ADJUST NUT	1
15	50002	ASSEMBLY, HOOK	1
14	50216	HEX BOLT, MODIFIED	2
13	50217	SHOULDER BOLT	1
12	50198	PIVOT PIN	2
11	50234	WEAR INSERT	2
10	20269	LOCK PLATE	1
9	50072	PLATE, NUT BEARING	1
8	807493-250	1/8" X 2.50 LG. COTTER PIN	6
7	20289-1A	LOCK PLATE, WRENCH BOLT	1
6	20289-2A	LOCK PLATE, WRENCH BOLT	1
5	50218 -1	BOLT, WRENCH	1
4	50218	BOLT, WRENCH	1
3	20078	JAW CRADLE ASSY.	1
2	50004-2B	JAW PLATE, MACHINED	1
1	50004-2A	JAW PLATE, MACHINED	QTY.
ITEM NO.	PART NUMBER	DESCRIPTION	

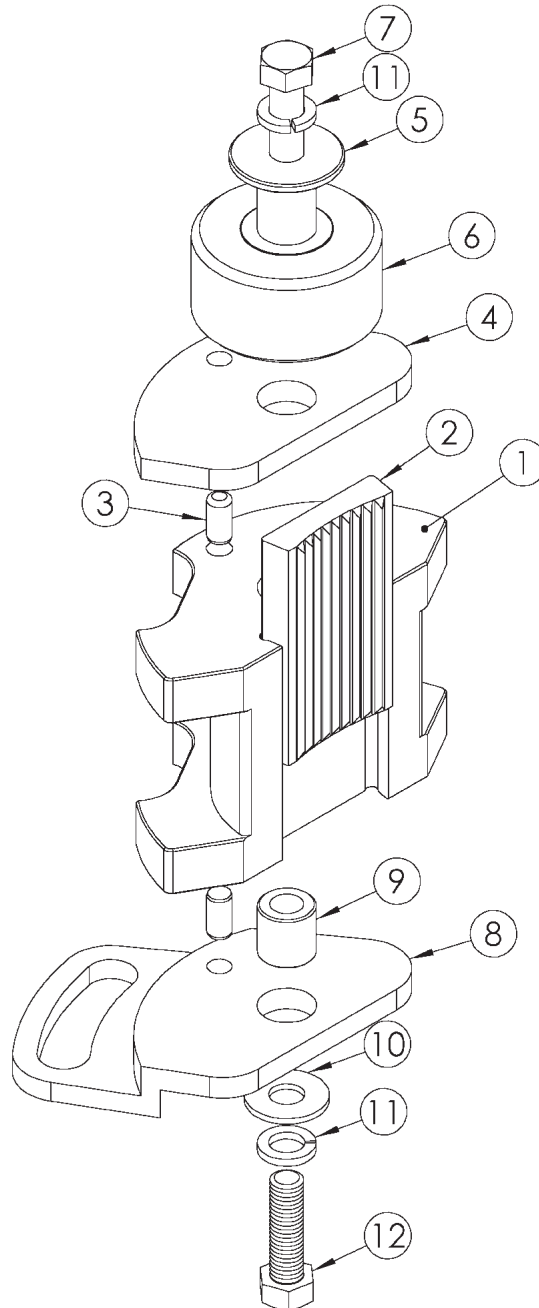
50209-TOP			
TOP HEEL DIE HOLDER ASSEMBLY			

9	810703	1/2" LOCK WASHER	2
8	20211-1	PLATE, DIE RETAINER	1
7	806307	1/2" -13 X 3.25 LG. HEX BOLT	2
6	20208A	SPACER BUSHING, ROLLER	2
5	20210	ROLLER ASSEMBLY	2
4	98381A622	PIN, DOWEL	2
3	50212-1	RETAINER, HEEL DIE	1
2	20194	DIE	1
1	20192-1B	DIE HOLDER	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.



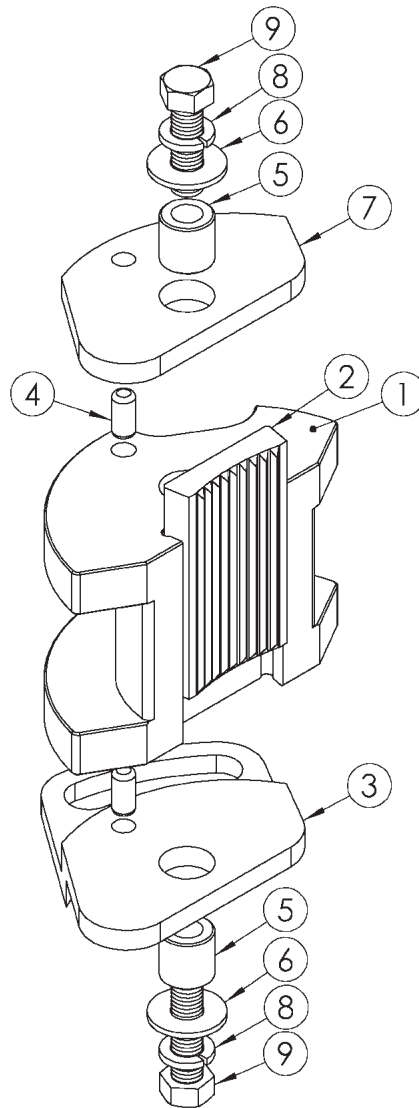
50209-MID			
MIDDLE HEEL DIE HOLDER ASSEMBLY			

12	806276	1/2" -13 X 1.75 LG. HEX BOLT GRD.8	1
11	810703	1/2" LOCK WASHER	2
10	810705	1/2" FLAT WASHER	1
9	20208-870	SPACER	1
8	50212	RETAINER, HEEL DIE	1
7	806307	1/2" -13 X 3.25 LG. HEX BOLT	1
6	20210	ROLLER ASSEMBLY	1
5	20208A	SPACER BUSHING, ROLLER	1
4	20211-1	PLATE, DIE RETAINER	1
3	98381A622	PIN, DOWEL	2
2	20194	DIE	1
1	20192-1B	DIE HOLDER	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.



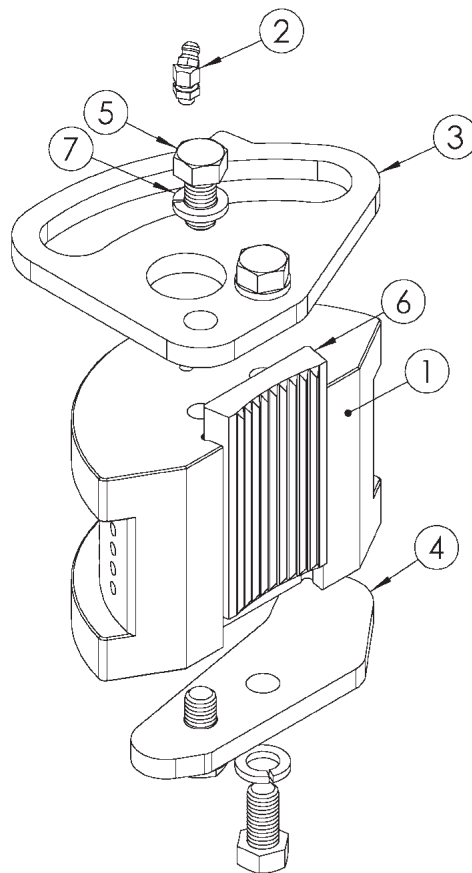
50209-BOT			
BOTTOM HEEL DIE HOLDER ASSEMBLY			

9	806276	1/2" -13 X 1.75 LG. HEX BOLT GRD.8	2
8	810703	1/2" LOCK WASHER	2
7	20211-1	PLATE, DIE RETAINER	1
6	810705	1/2" FLAT WASHER	2
5	20208-870	SPACER	2
4	98381A622	PIN, DOWEL	2
3	50212-1	RETAINER, HEEL DIE	1
2	20194	DIE	1
1	20192-1B	DIE HOLDER	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.



51711-TB	
TOP AND BOTTOM DIE HOLDER ASSEMBLY	

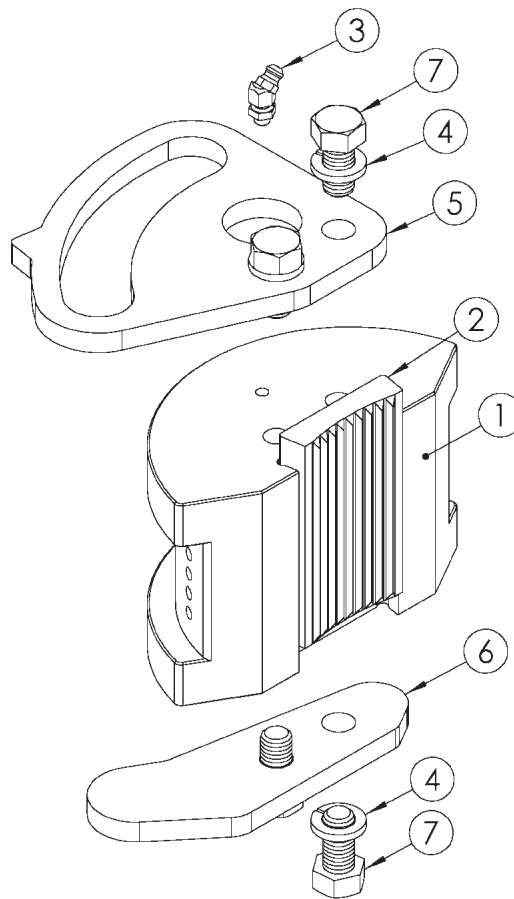
7	810703	1/2" LOCK WASHER	4
6	20194	DIE	1
5	806246	1/2" -13 X 1.00 LG. HEX BOLT GRD.9	4
4	20213	DIE RETAINER, BOTTOM	1
3	20212A	DIE RETAINER	1
2	1103K2	GREASE FITTING, 45 DEG.	1
1	20192B	DIE HOLDER, HOOK SIDE	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.



51711-MID

TO AND BOTTOM DIE HOLDER ASSEMBLY

7	806246	1/2" -13 X 1.00 LG. HEX BOLT GRD.9	4
6	20213	DIE RETAINER, BOTTOM	1
5	20212A	DIE RETAINER	1
4	810703	1/2" LOCK WASHER	4
3	1103K2	GREASE FITTING, 45 DEG.	1
2	20194	DIE	1
1	20192B	DIE HOLDER, HOOK SIDE	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.



Operation & Service Manual

Safety Requirements

Hawk equipment is installed and operated in a controlled drilling rig environment involving hazardous situations. Proper maintenance is important for safe and reliable operation. Procedures outlined in Hawk manuals are the recommended methods of performing operations and maintenance.

Personnel Training

All personnel performing installation, operations, repair, or maintenance procedures on the equipment, or those in the vicinity of the equipment, should be trained on the rig safety, tool operation, and maintenance to ensure their safety.

**Only authorized Hawk repair technicians should perform major disassembly and assembly procedures.*

Recommended Tools

Service operations may require the use of tools designed specifically for the purpose described. Hawk recommends that only those tools specified be used when stated. Ensure that personnel and equipment safety are not jeopardized when following service procedures or using tools not specifically recommended by Hawk.

General Safety Practices

The equipment discussed in this manual may require or contain one or more utilities, such as electrical, hydraulic, or pneumatic.

**Isolate energy sources before beginning work.*

**Avoid performing maintenance or repairs while the equipment is in operation.*

**Wear proper protective equipment during equipment installation, maintenance or repair.*

Replacing Components

**Verify that all components (such as cables, hoses, etc.) are tagged and labeled during assembly and disassembly of equipment to ensure correct installation.*

**Replace failed or damaged components with Hawk certified parts. Failure to do so could result in equipment damage or injury to personnel.*

Description

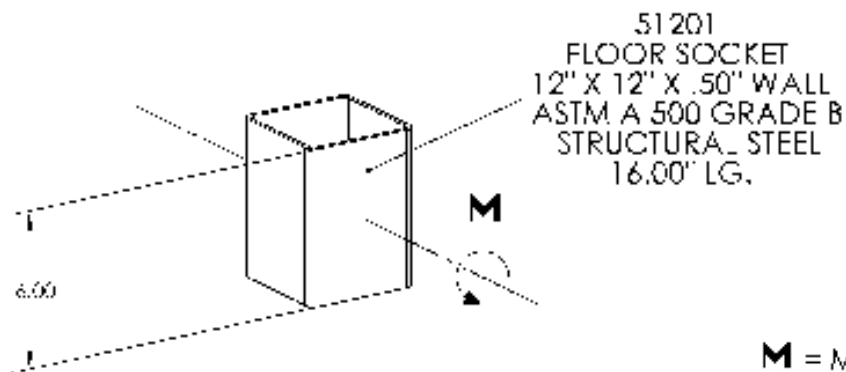
T-WREX is a pedestal mounted wrench/spinner combination tool for making up and breaking out threaded tubulars on drilling rigs.

A fully operational T-WREX consists of the following assemblies:

- *Transportation pallet
- *Pedestal, complete unit
- *Controls, complete with remote console, and control lines to tool
- *All documentation

OPTIONAL:

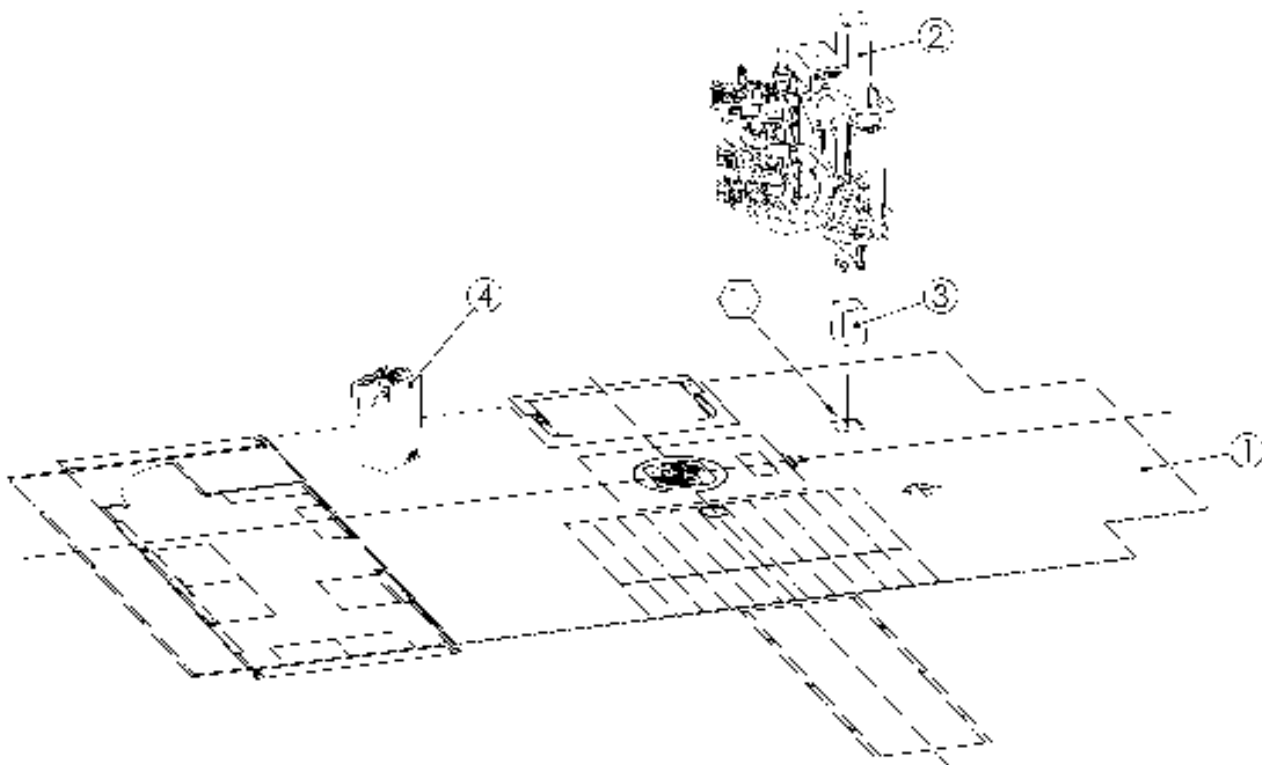
- *Floor socket/recieving tube (PN 51201), cut to 16" in length.



M = MAX. MOMENT
WHEN T-WREX IN
FULLY EXTENDED
POSITION

MODEL	M
T-WREX JR.	494,599 N./LBS.
T-WREX SR.	627,984 N./LBS.

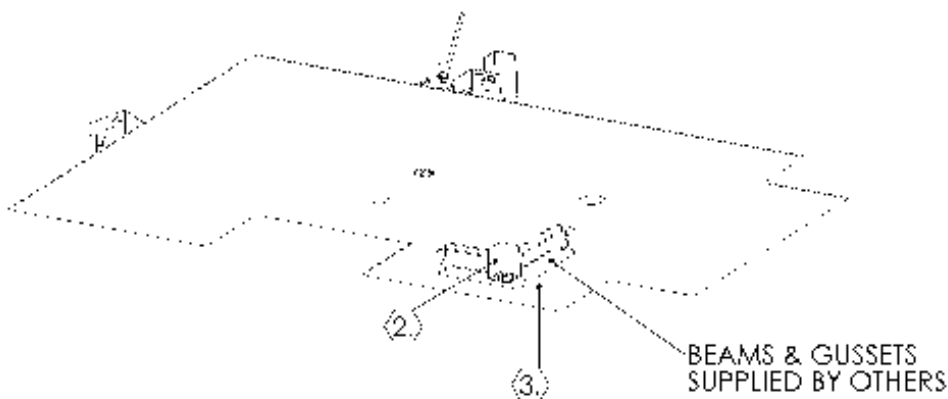
Installation



4 REF.	T-WREX CONTROL CONSOLE	1
3	51201 FLOOR SOCKET	1
2 REF.	1 WREX JR./SR.	1
1 REF.	RIG FLOOR EXAMPLE	1
ITEM NO.	DESCRIPTION	QTY.

NOTES:

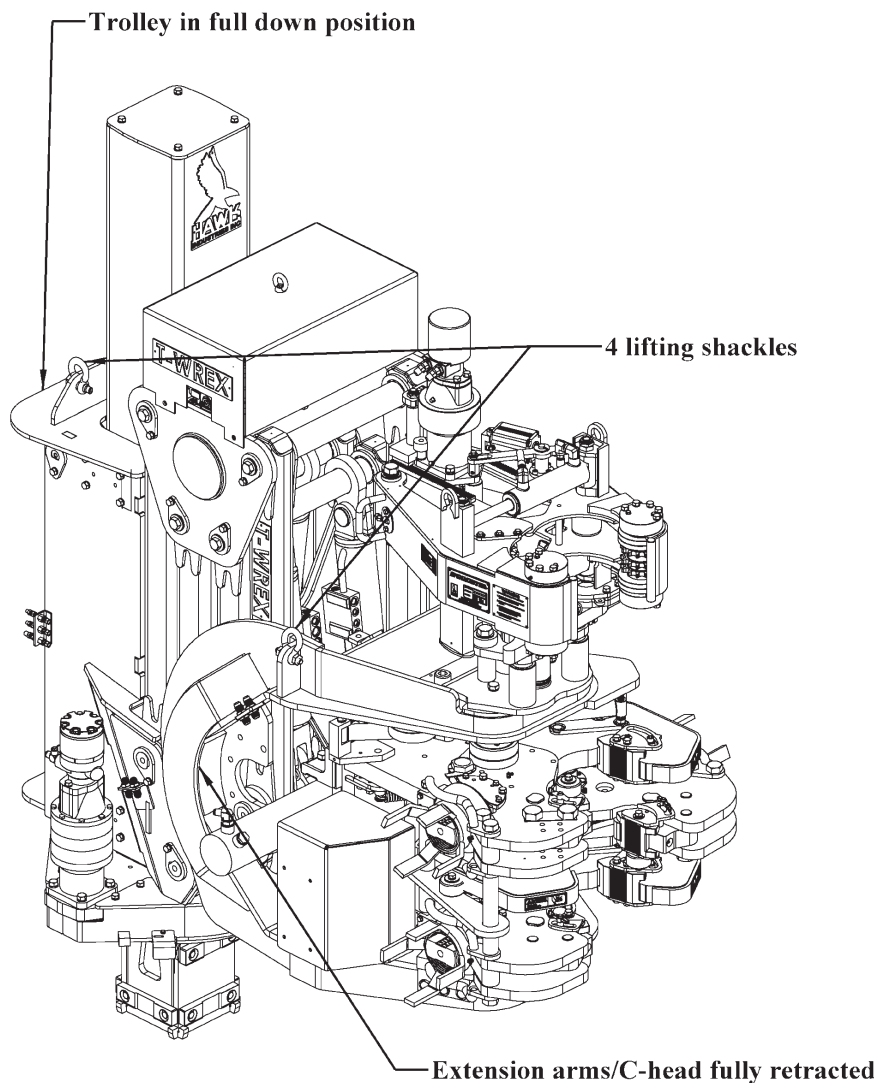
- (1) 12 1/8" X 12 1/8" SQUARE CLEARANCE HOLE IN FLOOR PLATE IN PRE-DETERMINED POSITION.
- (2) 51201 FLOOR SOCKET INSTALLED FLUSH WITH TOP OF FLOOR PLATE AND TWO ADJACENT SIDES PERPENDICULAR TO FLOOR.
- (3) DEPENDING ON LOCATION OF BEAMS UNDER FLOOR PLATE, FLOOR SOCKET SHALL BE ADEQUATELY BOXED IN USING SUITABLE BEAM MATERIAL OR GUSSETED AS REQUIRED.



Lifting the T-WREX

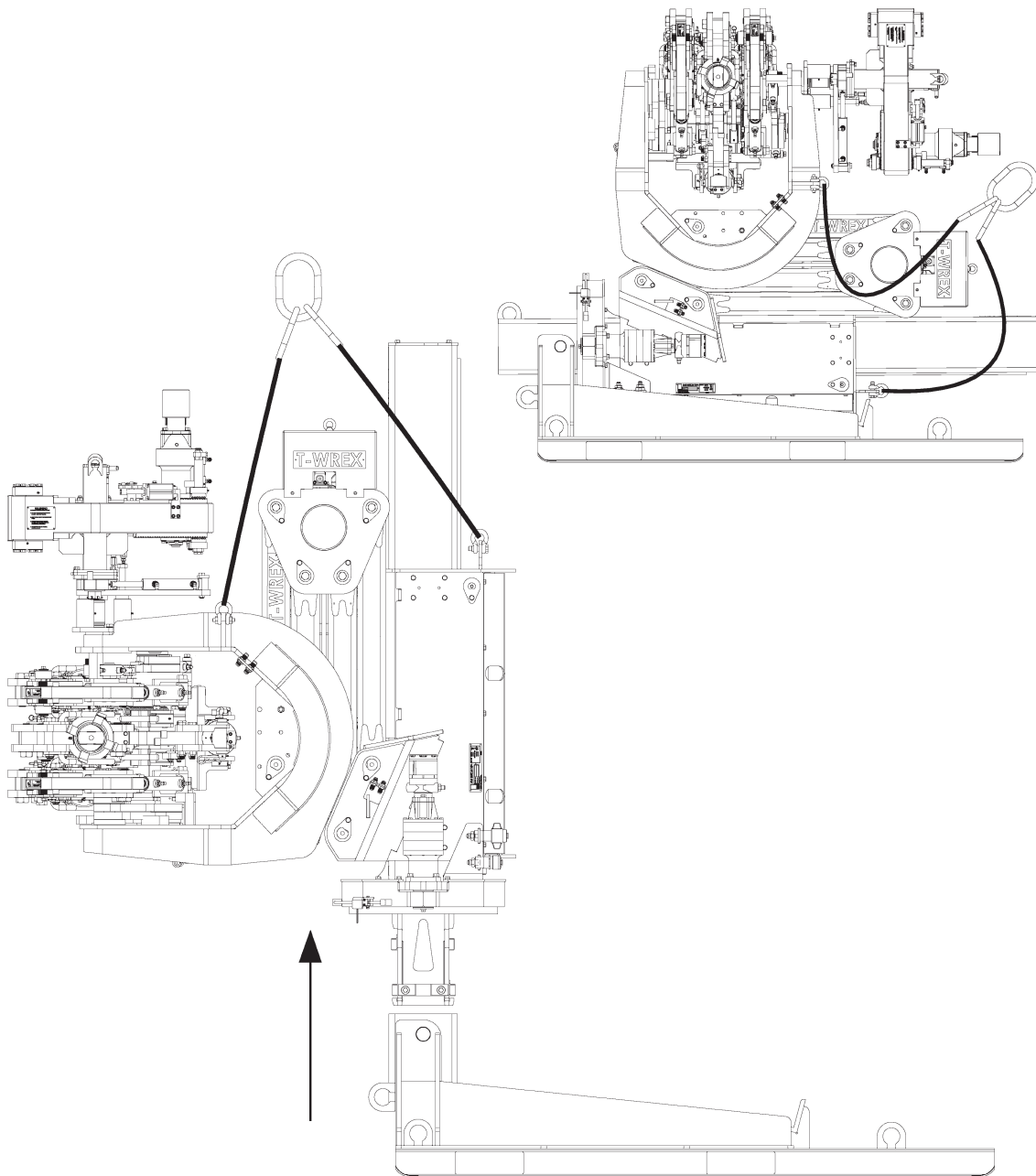
Before lifting the T-Wrex, verify that the trolley is in the full down position and the extending arms are fully retracted. Use the four lifting shackles attached to lugs on top of the C-Head and Trolley with lifting sling assembly (Sr. sling PN 51702, Jr. sling PN 51202).

**Always use the lifting lugs and shackles provided. Nothing else is rated for, nor intended to support the full weight of the T-Wrex.*



Transporting the T-WREX

Whenever transporting the T-Wrex, make sure the unit is supported in a stable manner. Attach tie-down straps to the four provided lifting shackles attached to the lugs of the C-Head and Trolley to the transportation pallet (pallet PN 51550) lugs.



51886 Control System Elements

The T-WREX controls are face mounted on a remotely located console.

Each lever/button introduces compressed air into different sections of the pneumatic control system.

A misrouted air line can cause the tool to operate in a manner not intended by the operator.

There are air operated elements in the control system that will route, close off, or vent air signals to pilot the hydraulic valves.

These elements are located under the control console panel, in the relay box, and up on top of the extending center pivot -- under a large box-shaped cover (four bolts).

There are **two basic logic element types** in T-WREX's control system, with the more complicated circuits being of varying configurations of logic elements combined.

The '**OR**' element (PN L15): it has two inputs and one output. Described easily: a three port "Y" with no crosstalk between the two input ports. Crosstalk is the energizing of an input port from another input port.

The other element is the **air piloted valve** (PN A501, or PN A508).

It has one pilot (spring return) or two pilot ports (pilot return), one air supply port, two output ports, and two venting exhaust ports.

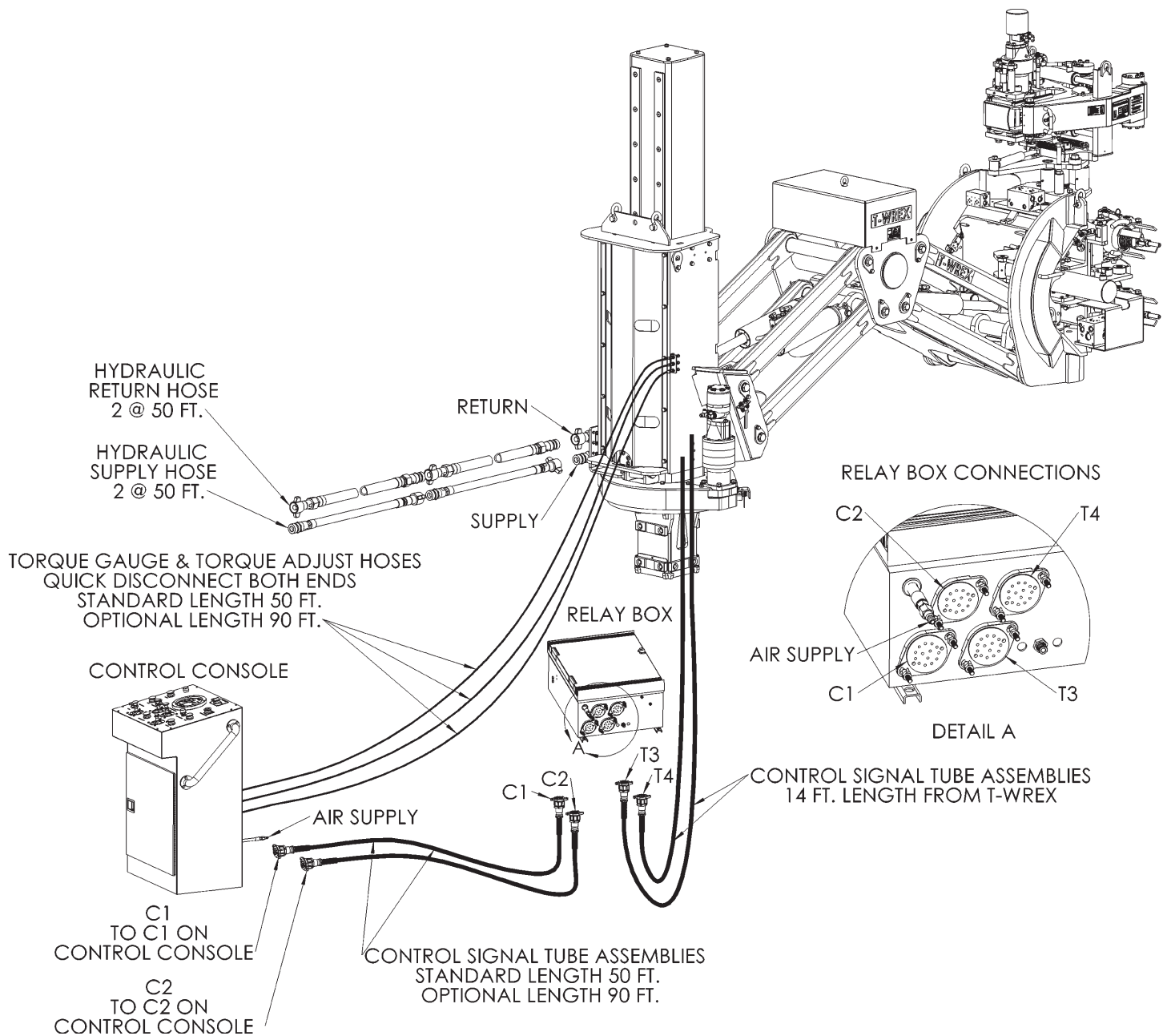
These valves have an internal spool shifted by at least one pilot signal (compressed air).

The input (supply air) is routed by the position of the internal spool to one output port only.

The input port on this valve is located between the two exhaust ports. The two output ports are on opposite face.

The other pneumatic elements within the control system are relays, logical NOT, and mechanical input valves (rotation and extend limits, set by operator).

51200/51700 General Arrangement



51507 Control Console

EMERGENCY STOP (detented): De-energize pneumatic control system

MAKE/BREAK MODE (selector): Toggle tool operation

*Operator must properly align the two working wrenches to box/pin shoulder line with the **HEIGHT** control lever.*

*On **make**: align between **bottom** and **middle** wrenches*

*On **break**: align between **top** and **middle** wrenches*

ROTATE (lever): Rotate entire unit about pedestal

ROTATE (button): Bypass rotate sensors when rotating, **OR** speed up unit when retracting

EXTEND (lever): Extend wrench and spinner units to target

FINAL ADJUST (momentary):

Jog unit in extend (forward), short distance (pneumatic timer)

Used to obtain **correct bite**. Also used to **bypass extend stops** when extending.

HEIGHT (lever): Align wrenches to target for proper operation. Trolley lift/lower.

TILT (lever): Align spinner and wrench head parallel to drill string.

GRIP (detented, wrench nuts must be set to target size): Grip target with back-up wrench

SPIN (momentary, spinner must be set to target size with *SPINNER ADJUST*):

Spin in new connection, or spin out an untorqued connection.

CHAIN OILER (momentary): Lubricate spinner chain, only during spinning operation

TORQUE (momentary): Grip target with torquing wrench and extend torque cylinder

SPINNER ADJUST (selector)

UNCLAMP: Unclamp motor assembly from spinner case, air cylinder pulls motor forward

ADJUST: Air cylinder pushes spinner motor back putting tension on chain

CLAMP: Clamps motor assembly to spinner case, must be clamped for spinning operation

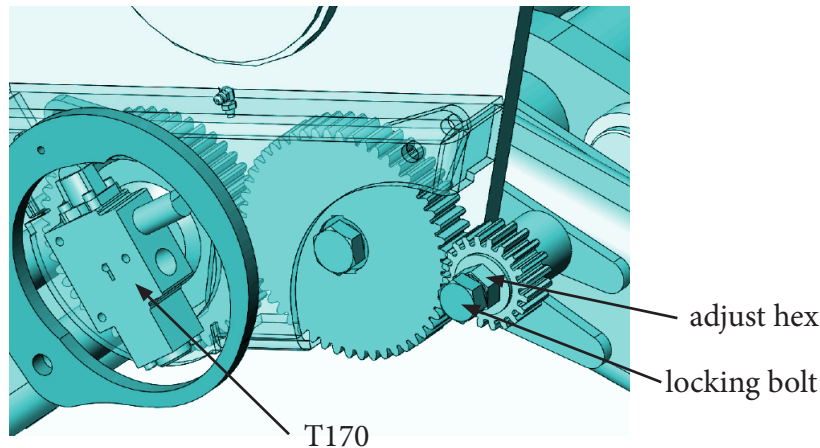
TORQUE ADJUST (knob, pilot valve): Adjust wrench output torque. To be set after initial spin and torque. Final reading read at beginning of torque cylinder stroke while torquing. Rotate adjustment knob in for more torque, out for less.

TORQUE GAUGE (torque arm calibrated gage): Torque indicator, displayed in FT/LBS. Read at beginning of torque cylinder stroke while torquing.

51141 SYNCHRONIZATION ASSEMBLY ADJUSTMENT

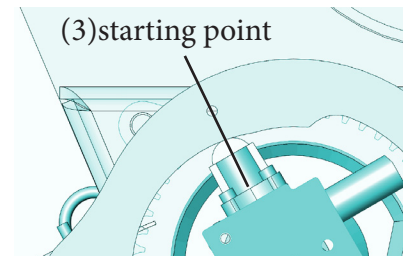
T-WREX's reach assembly consists of front and rear arms that require synchronization.

To achieve synchronization front to rear, front and rear hydraulic cylinders must receive an equal volume of hydraulic oil. 51141 is a continuously correcting mechanical-input hydraulic flow divider.



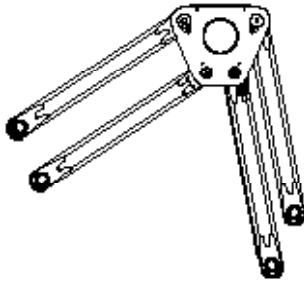
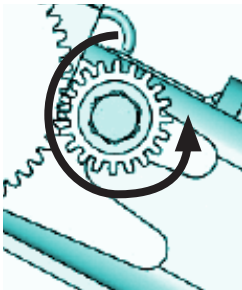
- (1) Extend unit fully.
- (2) Loosen locking bolt, then tighten snug.
- (3) Use 1 1/8" wrench to adjust T170 to starting point on cam.
- (4) Tighten locking bolt enough to keep driving gear from rotating during extend/retract operation.

- (5) Retract unit 3-4 feet.
- (6) Extend unit fully while observing which arm extends last.

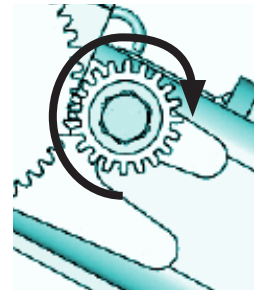
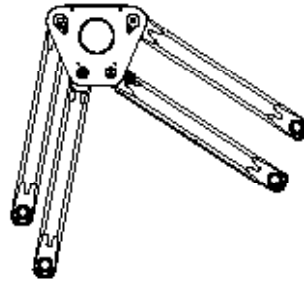


51141 SYNCRONIZATION ASSEMBLY ADJUSTMENT

Either back or front arms will extend last. Rotate adjust hex clockwise or counterclockwise accordingly.



rear arm extends before front arm,
adjust hex counter clockwise to increase flow
to front/reduce to rear.

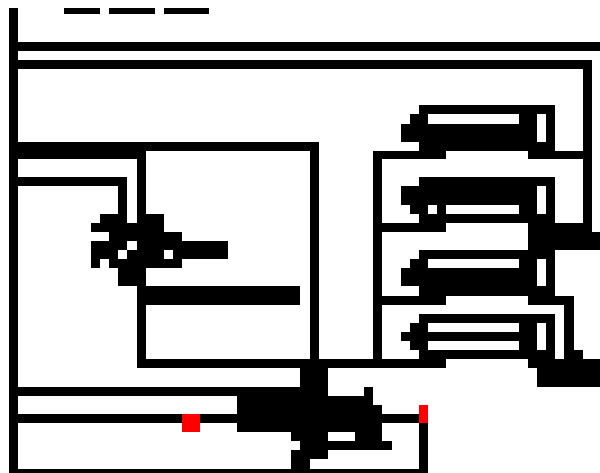


front arm extends fully before rear arm,
adjust hex clockwise to increase flow to rear/reduce
to front.

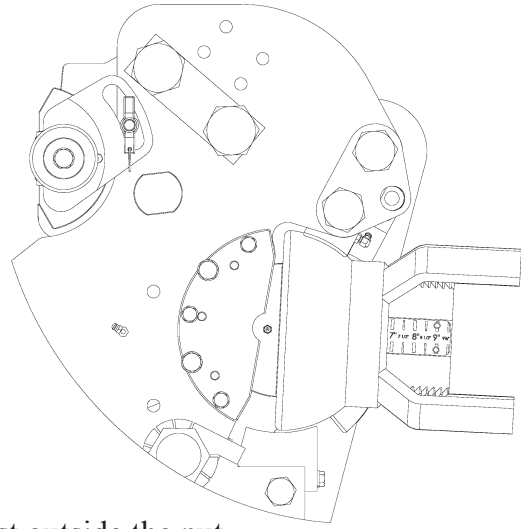
Repeat setps 5 and 6 after each adjustment.

The closer the arms get to sincronization, micro adjustments are required.
Tighten lockbolt and tap adjusting wrench with deadblow hammer to make small adjustments.

Adjustment is complete when both front and back arms extend fully at the same time.



Setup Wrenches

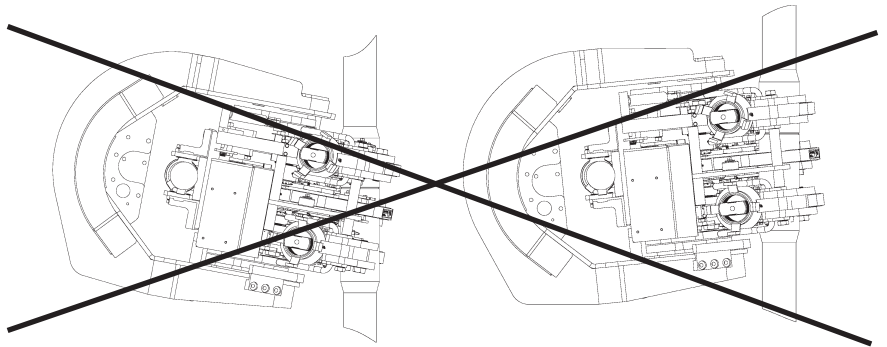


To set wrenches:

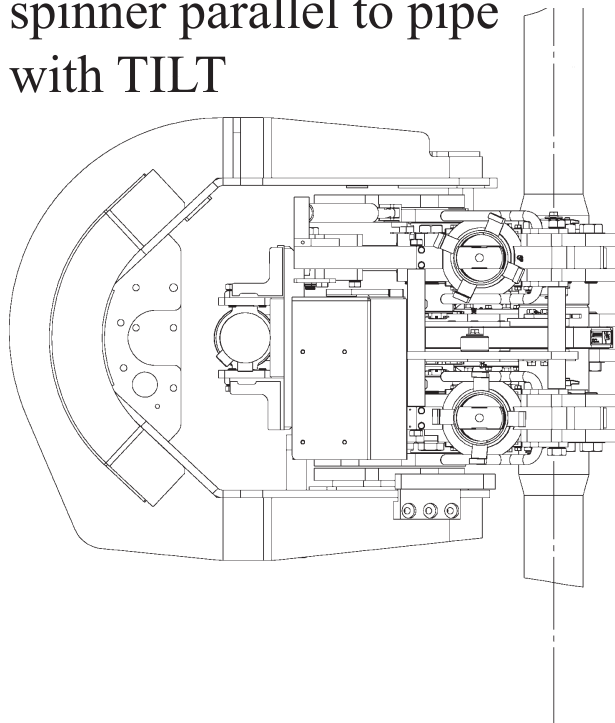
Scale on wrench refers to target O.D.

Scale is read looking straight down, reading graduation just outside the nut.

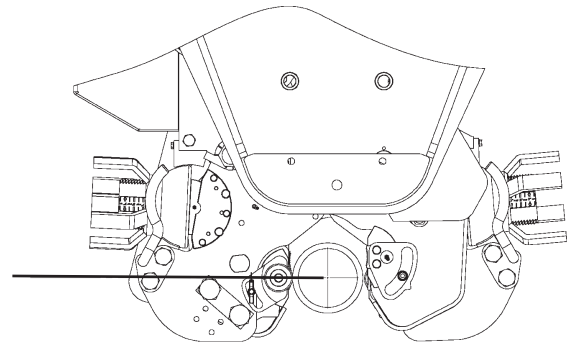
Check die retaining plate pointers after gripping for correct indication, extend/final adjust/retract/tilt as necessary.



Align wrenches and spinner parallel to pipe with TILT

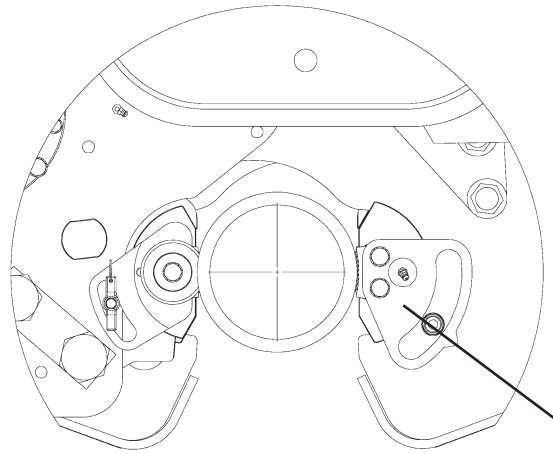
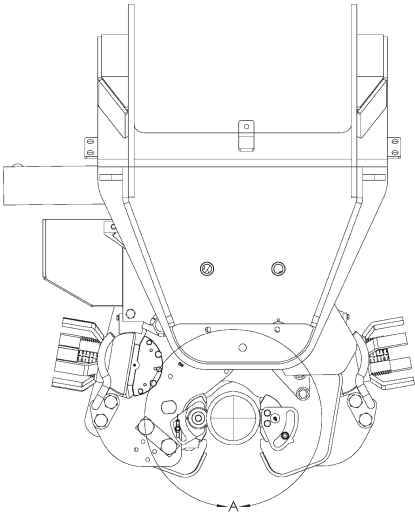


Extend until heel side die holder **bolt head** is centered over pipe

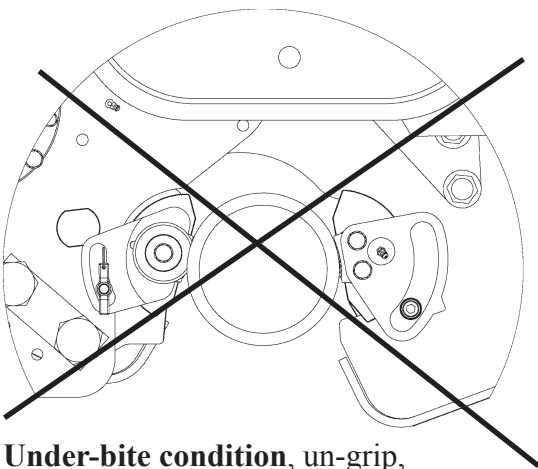


Setup Wrenches

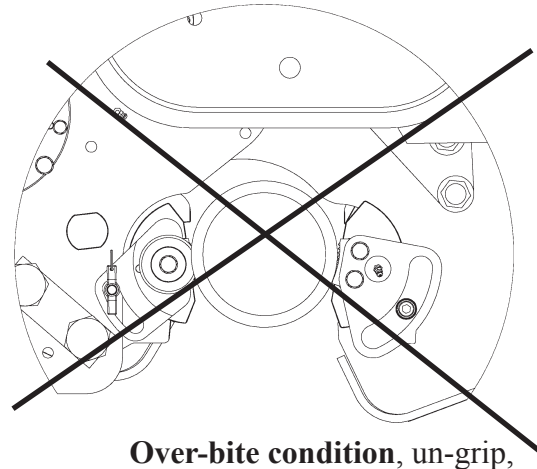
**Once lined up,
hit the grip button and take a reading**



**A good bite,
pointer on die holder retainer plate
lines up with bolt head**



Under-bite condition, un-grip,
check wrench nuts, rotate nut out for more bite
OR if heel side is NOT lined up to pipe center
use FINAL ADJUST button (momentary)

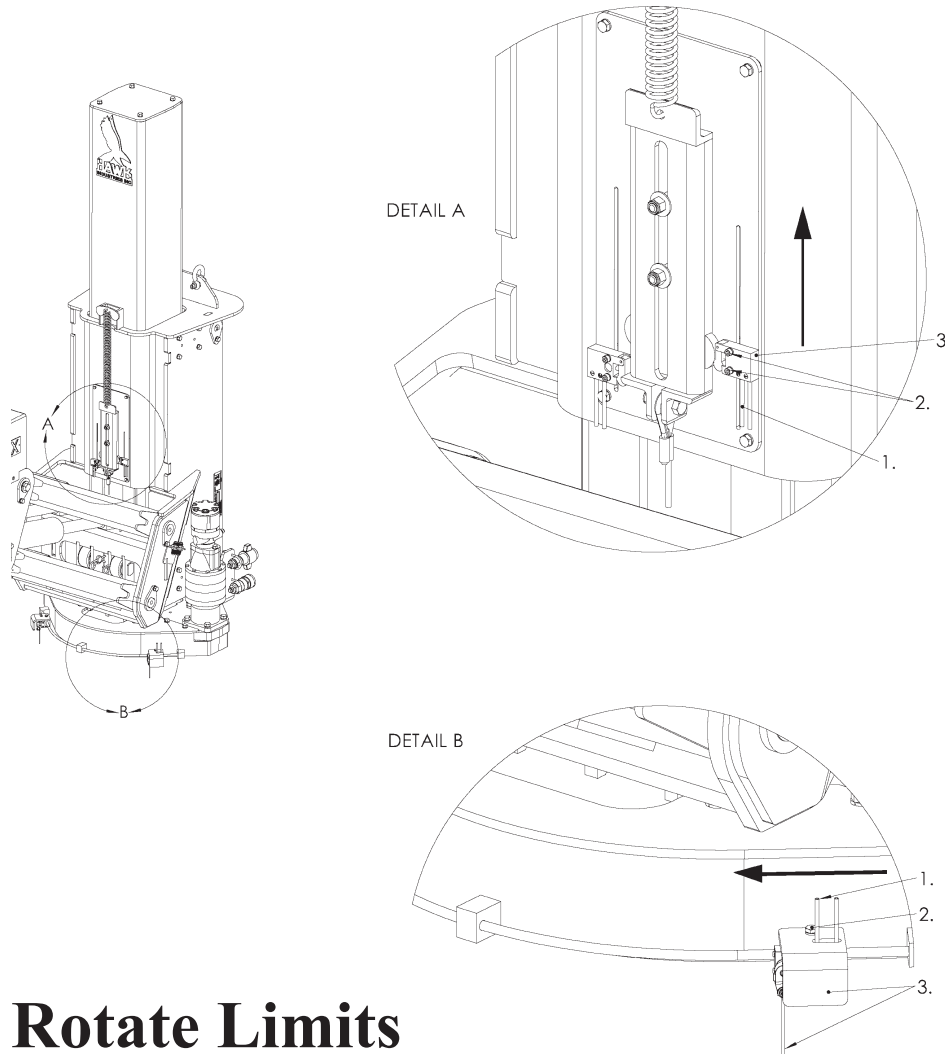


Over-bite condition, un-grip,
check wrench nuts, rotate nut in for less bite
OR if heel side is not lined up to pipe center
use RETRACT LEVER,
then FINAL ADJUST button (momentary)

51200/51700 Setup Limits

Extend Limits

Two adjustable extend limits disable EXTEND function when one is triggered. These are set to **well and mouse hole centers**. Pressing the FINAL ADJUST button while extending will bypass these limits.



Rotate Limits

Two adjustable rotation limits disable ROTATE function when one is triggered. These are set to **well and mouse hole centers**. Pressing the ROTATE button while rotating will bypass these limits.

950TWA Spinner Adjust

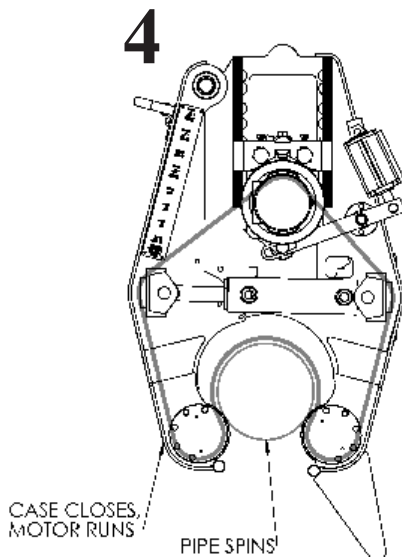
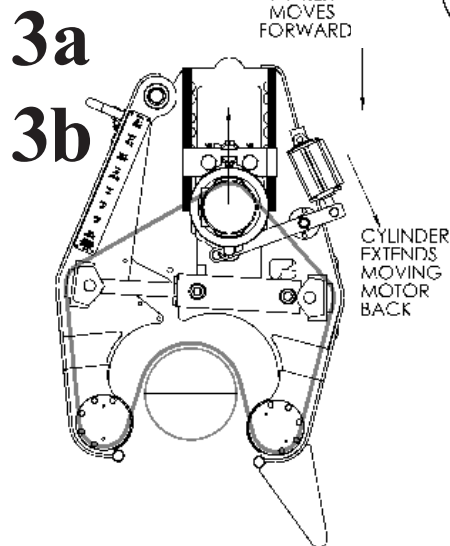
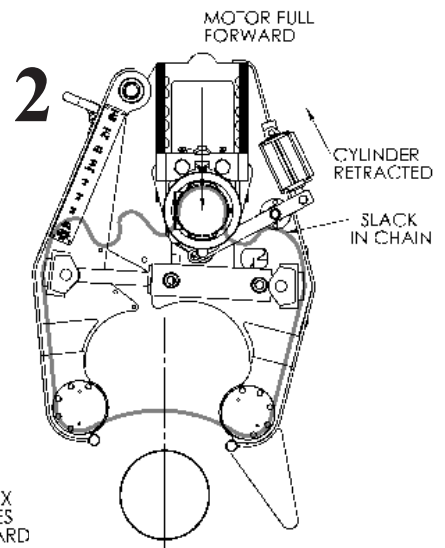
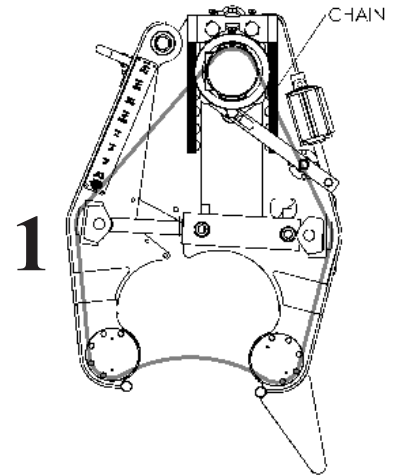
WRENCHES MUST BE SET PRIOR TO SPIN OPERATION

To adjust spinner:

- 1.) Retract unit off target.
- 2.) Place *SPINNER ADJUST* to **UNCLAMP**
- 3.) Extend unit until target is nested into spinner.
 - a.) Place *SPINNER ADJUST* to **ADJUST**
 - b.) Place *SPINNER ADJUST* to **CLAMP**

SPINNER IS NOW SET

- 4.) **GRIP and SPIN**



Operating Modes

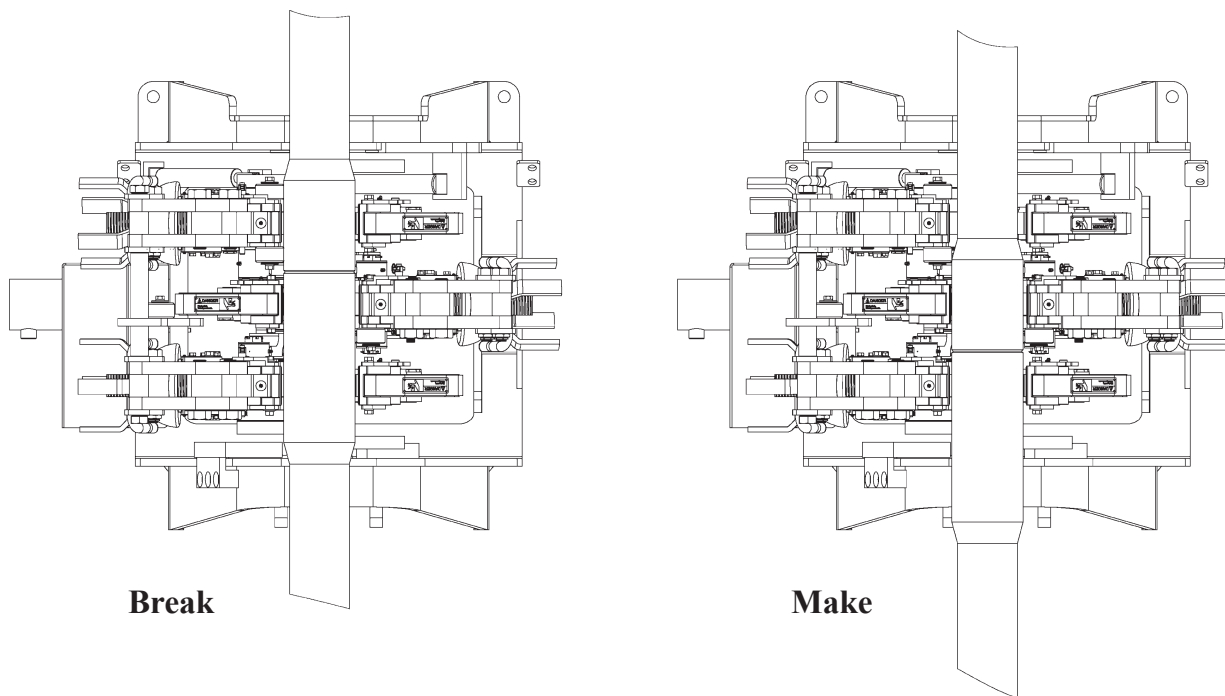
T-WREX utilizes a three wrench system for making up and breaking out threaded tubulars. Only two of the three wrenches will operate in either make or break mode.

Make: This mode sets the tool to make up new connections.

In this mode, the bottom wrench backs up the middle torquing wrench. Enabling the grip button (detented) in this mode will grip **bottom** as back-up wrench. Pushing the torque button (momentary) will sequence **middle** wrench grip and torque operation.

Break: This mode sets the tool to break out made connections.

In this mode, the middle wrench backs up the top torquing wrench. Enabling the grip button(detented) in this mode will grip **middle** as back-up wrench. Pushing the torque button(momentary) will sequence **top** wrench grip and torque operation.



Required wrench position relative to tool joint line for make or break mode.

Control Sequence

Basic Operation:

1. Set wrenches (pages 75-76)
2. Set spinner (page 78)
3. Set a rotate and an extend limit (page 77)
4. Height adjust for make or break (refer to previous page)
5. Hit GRIP
6.
 - For Make:
 - hit SPIN until shouldered, release
 - hit TORQUE until torqued, release
 - UN-GRIP
 - For Break:
 - hit TORQUE until joint is broken, release
 - hit SPIN until done, release
 - UN-GRIP
7. Retract unit off target, continue drilling operation

Routine Maintenance

Maintain:

Wrenches:

- Grease wrench nut threads
- Check dies for wear, replace if slipping

Spinner:

- Check chain for wear
- Hit OILER button for 3-5 seconds every third or fourth spin

Grease:

- Zerk fittings in and around:
 - Spinner
 - Wrench head
- Main rotation bearing assembly (PN 51220)

Check:

- Hydraulic oil level in power unit (PN 51640)
- Air filter indicator, replace filter if indicator is red
- Hydraulic oil filter indicator, replace filter if indicator is red

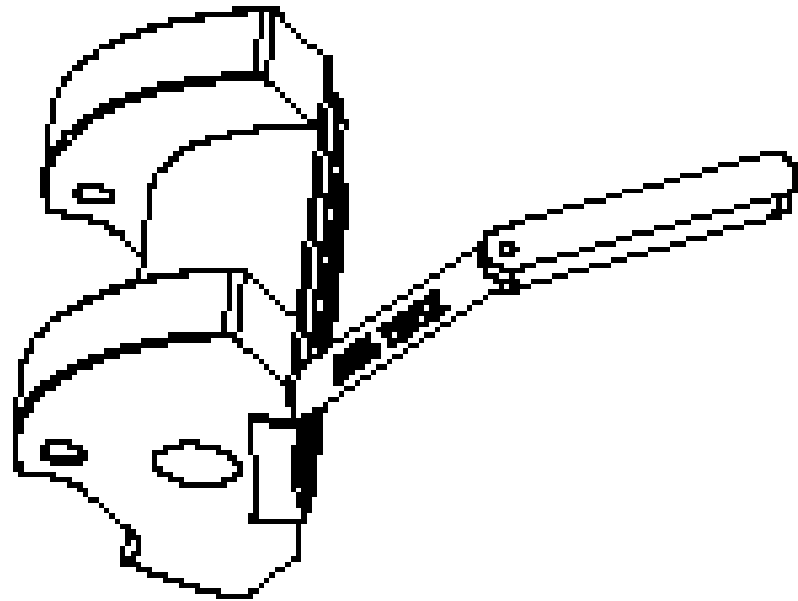
Equipment must be maintained on a routine basis.

**Failure to conduct routine maintenance could result in equipment damage or injury to personnel.*

Proper Use of Equipment

Hawk equipment is designed for specific functions and applications, and should be used only for its intended purpose.

Die Holder Wear



**.005 INCH MAXIMUM ALLOWABLE DIE HOLDER WEAR
MEASURED WITH NEW DIE IN PLACE**

Consumers Data

NAME	QTY.	BORE	ROD	STROKE	PORT
EXTEND	4	4	2	12.28	SAE 8
HEIGHT	1	4	2.25	38	SAE 8
TILT	2	3	1.5	3.25	SAE 8
ROTATE	2	45.6 cu. in/rev through 27.04:1 reducer			SAE 10
JR. TOP GRIP	1	2.5	1.25	4.13	SAE 8
JR. MID&BOT GRIP	2	2.5	1.25	4.13	SAE 8
JR. TORQUE	1	4.5	2.5	16	SAE 10
SR. TOP GRIP	1	2	1.25	6.06	SAE 8
SR. MID&BOT GRIP	2	2	1.25	6.06	SAE 8
SR. TORQUE	1	4.5	2.5	26.89	SAE 12
PUSH	1	1.5	1	6	SAE 8
ADJUST	1	1.5	1	3	SAE 4
CLAMP	1	1	0.825	2	SAE 4
DOORS	2	2.5	1.25	6	SAE 8
MOTOR	1	8.6 cu. in./rev through 5.2:1 reducer			SAE 10

MAINTENANCE SCHEDULES

HAWK INDUSTRIES, INC.	
T-WREX® RECOMMENDED MAINTENANCE CHECKLIST	
T-WREX S/N:	Rig Name:
	Pipe Size:

Maintenance Check Date:

A TICK SHOWN IN THE CLEAR CELLS, WILL INDICATE THE ITEM WAS FOUND TO BE ACCEPTABLE

PLACE A TICK IN THE APPROPRIATE BOX ON THE RIGHT	✓	✓	✓	✓	✓	✓	✓
Overall Visual Inspection							
CHECK THAT EMERGENCY STOP BUTTONS ARE OPERATIONAL							
Check all cables for broken strands							
Check that die holders are greased and rotating							
Check level of Middle Wrench for bearing wear							
Check for wear and grease oil							
Check for Hydraulic plumbing leaks							
Check spinner chain and grease (spray)							
Check Low Torque warning system							
Check Torque readings							
Activate & grease all wrench adjustment nuts							
Check & grease pin of pins behind adjustment nuts							
Check Hydraulic filter (Red bullhorn)							
Check angle brackets							
Check all Grip Cyl mount bolts							
Check all linkage mount pins/bolts							
Check losses on spinner Assy							
Check die rollers & holders for position & bearings							
Apply grease to all grease fittings & check if in place							
Check quick release pins on die holders							
Check wear grooves on spinner rollers							
PERFORM FUNCTION TEST							
Check spinner reducer bearing							
Check level of spinner							
Check spinner gearbox oil level							
Drain water separator in air system							
Check tightness of all bolts & castle nuts							
Check all castle nuts for cotter pins							
Clean air filter dryer							
Check grip pressure (1000psi)							
Rotate Hoses							
Check welds on all Jaw Plates							
Change Spinner Reducer Oil (10W)							
Magnetic Particle Inspect All Hook Threads (unless 1/2 inch) EXP DATE:							
Remove & clean all end caps on BOSCH valves							
Torque Gauge Calibration Next Call. Date: S/N:							
Maintenance Inspection by: _____ Workshop Supervisor's approval: _____							